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The Peach

by U. P. Hedrick

New York Agricultural Experiment Station

THE PEACH is second only to the apple as a money-making orchard crop in America. It is true that there are many elements of chance in growing peaches for the market, but this makes peach culture all the more attractive to those who have the soil, climate and ability to grow peaches. To the home fruit-grower, the pleasure of good peaches and the fields of adventure into which peach-growing leads him, make the charm of the peach irresistible.

Location and Soil

High rolling or hilly lands are good peach lands because they are naturally well drained and because there is less danger of winter injury, and the blossoms escape the late spring frosts which are so disastrous to the peach crop. The peach thrives upon a great diversity of soils, provided two conditions be present—good drainage and soil warmth. Few realize the importance of soil warmth for this fruit. It is chiefly because sandy, gravelly and stony soils are warm that the peach is grown thereon. Upon such soils, the trees make a firm growth, the wood matures thoroughly and the fruit is highly colored and well flavored.

Fertilizers for Peaches

From theoretical consideration, fruits need comparatively little plant food because: From 80 to 90 per cent of the fruit crop is water; the food used in the foliage is returned to the soil; trees have a feeding and growing period of several years before they bear fruit; the growing season for trees is from early spring until late fall; the roots of trees go deep and spread far into the soil; trees transpire relatively large amounts of water and hence diluted solutions of plant food suffice to furnish food; nearly all trees have "off years" of bearing in which to recuperate.

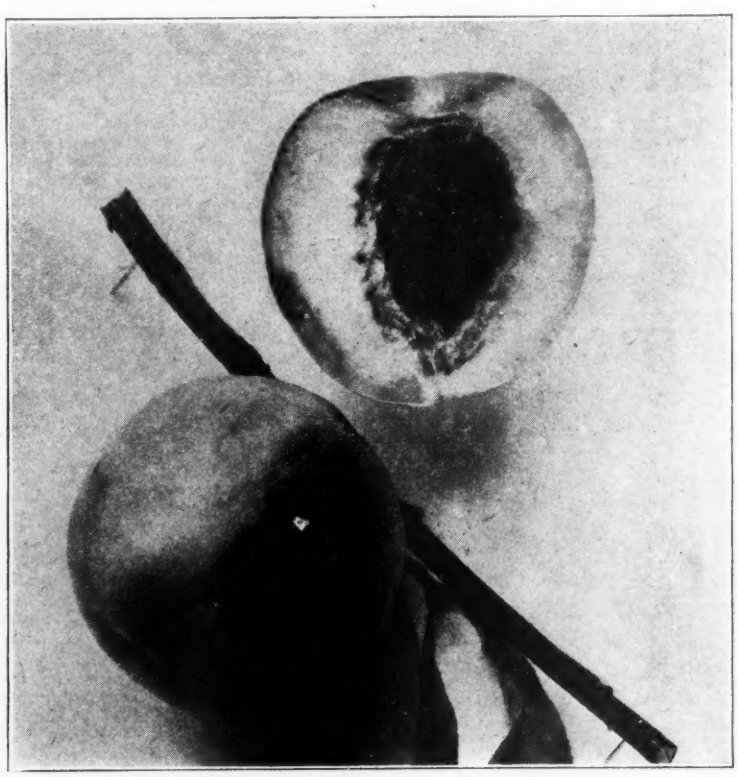
Experiments in various parts of the United States confirm the hypothesis that tree fruits need less food than farm, truck and small fruit crops, and every observing man has seen good fruits of the several kinds grown on soil too poor to make good farming lands. The peach, in particular, is found thriving on soils so sandy, gravelly or stony that it is difficult to secure a good catch of cover crops. In concluding this topic, let it be plain to all that it does not follow from the above statements that the peach never needs fertilizers. On the contrary, peach trees are often benefited by additions of plant food. The important fact is that this and all other fruits must be given fertilizers with great care if it is to be done without waste. A fruit grower ought to experiment and know that he is getting the worth of his money before he uses fertilizers on his trees.

Moisture for Peaches

A far more important factor than food for the peach is drink. The peach grower must use all possible means to provide water for his trees in the dry summer months. After having selected land naturally retentive of moisture, or having a supply in the subsoil, making sure that the drainage is good, all that can be done is to supply organic matter to make the soil more capable of holding water, and by continuous cultivation conserve the rainfall.

Cultivation

However men may differ as regards cultivation for the apple, few will deny the necessity of it for the peach. An untilled peach orchard is the desolation of desolations. Peach orchards that "don't pay," nine times out of ten, are sod-bound orchards—trees sick with "sod-yellows" and thirsting for the water which goes to the grass. Never put the peach in sod, nor sow the orchard to grain. Plow in fall or spring, cultivate the surface soil until the middle of August and follow with a cover crop to be plowed under the next spring.



Early Crawford, one of the best flavored peaches.

Hardiness in Peaches

The greatest problem the peach grower has to face is how to avoid injury from freezes and frosts. The problem is not insurmountable; for here and there varieties and orchards are wholly uninjured, and possibly adjoining others partly or wholly killed. What conditions of trees, soil, or care, make for hardiness?

The peach must have a warm, well-drained soil to secure the greatest possible hardiness inherent in the species. Either extreme of moisture—excessive wetness or excessive dryness—gives favorable conditions for winter killing. The wood of some varieties is more succulent than that of others, making such sorts susceptible to cold. The small growing varieties with compact heads are hardier than the free growing sorts with large heads. The following are the most compact growers: Hill Chili, Crosby, Gold Drop, Triumph, Wager and Fitzgerald. Trees are more likely to suffer from cold if unthrifty than if thrifty. Late fall growths are very susceptible to winter injury in both wood and bud.

The most effective treatment to avoid winter injury is to sow cover crops, as they protect the roots from cold, cause the trees to ripen thoroughly and assist in regulating the supply of moisture. Buds and branches are more often injured in high-headed trees than in those with low heads. Testimony is for most part unfavorable to windbreaks.

The five varieties of peaches most hardy in wood are: Crosby, Hill Chili, Stevens Rareripe, Gold Drop and Elberta. The Crawfords are considered most tender in wood. The five most tender in bud are the two Crawfords, Chair Choice, Reeves Favorite and Elberta.

Leaf Curl

Leaf curl is one of the easiest of all diseases of fruits to prevent; yet, in the aggregate, the loss to peach growers from leaf curl is enormous. The damage done year in and year out is as great as that from all other peach diseases. It is the "white plague" of this fruit. Trees are seldom killed by the disease, yet it saps their vitality and cuts short their days. Orchard trees and nursery stock alike suffer. Copper sulphate or lime sulphur sprays in any of their forms for dormant wood easily control leaf curl.

Pruning

Of all the tree fruits, the peach requires most attention in pruning. At best, it is a short-lived tree and if allowed to spend all of its powers of growth each year, it soon exhausts itself and dies of old age. Moreover, its habits of bearing are such—the fruit buds being borne on the current year's wood—that unpruned trees soon become unmanageable.

Pruning the peach resolves itself into two distinct problems: First, to increase the vigor of the tree; and, second, to train the tree to a form that will make orchard operations easy and give a maximum amount of fruit-bearing wood. It is presumed that a peach grower wants a "merry life and a short one" for his trees, and in order to secure this on sandy soils, he must head back. The hardy sorts, nearly all of which are weak in growth, must be pruned much more severely than the stronger growing kinds, which, as a rule, do not bear nearly so many fruit buds.

The peach does not bear transplanting as well as most fruits. It is necessary, then, in order to prevent excessive evaporation from the top as the plants start, to cut away part of the branches—best done by cutting back all branches to stubs several inches in length or by cutting to a whip. The second year the top must be formed.

Two forms of top are open to choice—the vase form or open-centered tree, and the globe-centered tree. In the first, the framework of the tree consists of a short trunk, surmounted by four or five main branches ascending obliquely. In the second, the trunk is continued above the branches, forming the center of the tree, and, later, by being headed in, a globe-like head is formed. The vase form is nearly always chosen.

Beginning with the second year, if heading back seems necessary, the main branches should be shortened from one-third to one-half their growth, cutting to upper and inner buds so that the oblique ascending vase form is maintained. The pruning of the third season is much the same, except that some of the interior branches should be removed to open up the heads to air and sunshine. The third season's pruning may be repeated from year to year, bearing in mind that the slow-growing, hardy, productive sorts can be pruned much more severely than the free-growing, tender kinds. Open forks should be carefully avoided, thus greatly lessening the danger of splitting when branches are heavily laden.

Cover Crops

Cover crops hasten seasonal maturity, protect the tree and soil, add humus and, with legumes, nitrogen to the soil, modify the physical structure of the soil and make available much plant food in the soil. Cover crops

(*Concluded on page* 21)

Loganberry Growing in the Northwest

by F. L. Ballard and Clayton L. Long
Oregon Agricultural College

THE LOGANBERRY is exclusive to the Pacific Coast regions west of the Cascade and Sierra Nevada mountains, and in this large strip of territory, this excellent berry is partial to certain districts, among which the Willamette valley of Oregon stands out particularly.

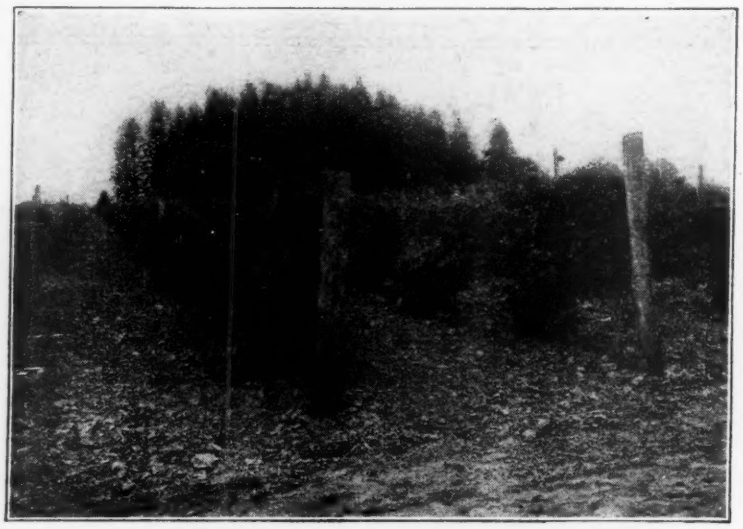
Yet there are many other Pacific Coast berry districts in which the logans are rather extensively grown. For instance, logans assume commercial status in southwestern British Columbia, in the Puyallup valley in Washington, around Sabastopol, Calif., and in some very protected places in the Puget Sound country. Zero temperatures preclude possibilities of success with logans, and hot, dry summer weather is equally unfavorable. Likewise, the summer conditions of the southern states are unsatisfactory.

This rather narrow limitation of climatic suitability has made the Willamette valley the loganberry center and, roughly, 90 per cent of the world's supply is produced in Oregon and about half of this volume in Marion county, located in the heart of the Willamette valley.

Oregon's plantings now total 7000 acres. This appreciable addition to the horticulture of Oregon has grown from a small scattering, almost negligible production, in 1909.

Marketing a Fundamental Problem in the Loganberry Industry

In the period of loganberry development, there have been alternate periods of high prosperity for the growers and periods of deep depression, as might be expected in the rapid development of a new fruit unknown to the market. Years of greatly stimulated plantings followed prices that went too high, for example, 13 cents a pound in 1920. These boom times were always in turn followed by price depressions, resulting from increased acreage, while the consuming public was being educated to the real excellence of the loganberry, properly packed, processed or converted into juice. The 1923 season was a discouraging one and probably half the crop was unpicked. Growers became pessimistic and some yards were abandoned. Such conditions have occurred before and then recovery was rapid. The recent situation, however, has impressed anew upon Oregon growers that marketing is a fundamental problem in the loganberry industry. The collapse of the juice business in the deflation following the war precipitated a heavy tonnage of canned and evaporated berries on a relatively uneducated market. Price fluctuations have made the logan market an uncertain one for the established trade.



Loganberry field in the Willamette Valley.

Nevertheless, the excellence of the berry and the possibilities of large yields in the Willamette valley lend an optimistic tone to the loganberry business as a substantial part of a well-managed berry farm. Attention to quality of product and yields per acre, together with diversifying on the farm with blackberries, raspberries and other small fruits, are recognized as fundamental principles in the advancement of the industry. In fact, a large meeting of growers at the Oregon Agricultural College in January recommended that there be no immediate increase in acreage but added attention given to quality and yield.

Average Yield Two Tons Per Acre

The matter of yield is fundamental. The state average is around two tons to the acre; three tons may be set as a general yield requirement for profitable loganberry farming. The more successful growers easily exceed this figure as a general practice. For instance, Carl Aspinwall, of Marion county, recently harvested 42.7 tons from eight acres, a yield of five and one-third tons per acre. Mr. Aspinwall harvests, as a general thing, about five tons per acre. L. H. Martin harvested four and seven-tenths tons per acre from a 10-acre yard.

The Aspinwall family has been prominent in loganberry development in Oregon and A. M. Aspinwall, now deceased, had 35 acres in bearing in 1910. A. M. Lafollette was one of the first to grow loganberries. He secured a few plants in 1899. The original planting is still producing commercially.

Mr. Aspinwall Believes Yield Could Be Doubled

Carl Aspinwall is one who believes the average yield of the loganberry yards could be doubled at least. Moisture conservation, drainage and fertilization are the three outstanding problems, he believes. He attributes a 25 per cent increase in his own yields to moisture conservation and the use of nitrate of soda and superphosphate. The best loganberry soils are the clay loam and black loam

(*Concluded on page* 13.)

Trying to Tame the Blueberry in Minnesota

by W. G. Brierley
University of Minnesota

Figure 1—The "lowbush" blueberry plant, showing growth habit and rhizomes at the sides.

THE "LOWBUSH" blueberries, *Vaccinium Pennsylvanicum* and *Vaccinium Canadense*, grow profusely in the wild in the northeastern quarter of Minnesota and in northern Wisconsin. The "highbush" blueberry of the East, *Vaccinium corymbosum*, although often said to be native in this region, has not been found in the wild. Reports of its occurrence when traced down have always led to well developed plants of one of the "lowbush" species.

Throughout this region, as in other places where the blueberry grows well, the fruit is held in high esteem. The wild crop harvested here each season ranges above $50,000 in value, although definite figures cannot readily be obtained. Much of the fruit reaches the market in a decidedly unattractive condition. The Indians, who do a great deal of the picking, handle the fruit carelessly, and the shippers generally make little or no attempt to clean or grade the fruit. That such fruit sells as well as it does is a good indication of the public demand for blueberries.

For many years it has seemed possible to develop an industry in Minnesota based on cultivated blueberries. The writer has long been interested in the blueberry and has followed with great interest such pioneer work as that of Dr. F. V. Coville of the United States Department of Agriculture, in determining the conditions under which blueberries might be grown successfully, and the work of Miss Elizabeth C. White of Whitesbog, N. J., who has shown how the highbush blueberry should be handled in the cultivated field.

With such marked progress being made with the highbush blueberry in the East, it seemed highly desirable to study the possibilities for blueberry cultivation in Minnesota. This study was begun in 1916, with two widely different questions to solve. First, there was the hardy native lowbush blueberry—could it be introduced into cultivation? Could improved varieties be selected or developed, and could these be propagated readily? If worthwhile varieties could be developed, how could these be handled in the field for best results? The second question dealt with the "highbush" blueberry of the East. If the greatly improved varieties of Dr. Coville and Miss White were introduced, would they find the soil suited for proper development? Would they be able to withstand the dry cold of Minnesota winters? If these varieties should fail, would plants from the northernmost range of the species fare any better?

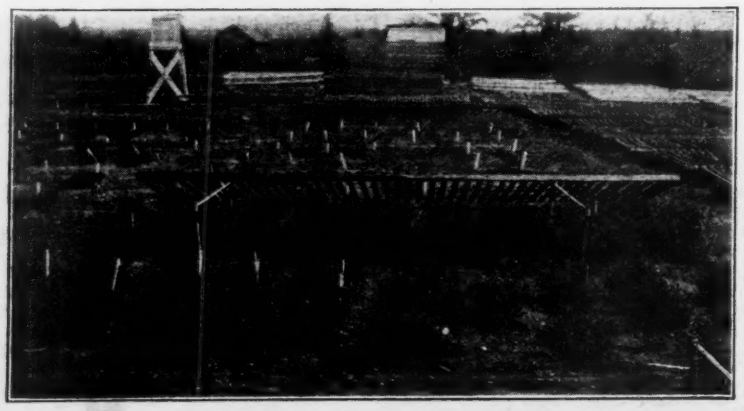


Figure 3—Two of the culture plots in the Forest Nursery at Cloquet. Lath screen over second plot for half shade has been removed to show plants. Cultivated plot in foreground.

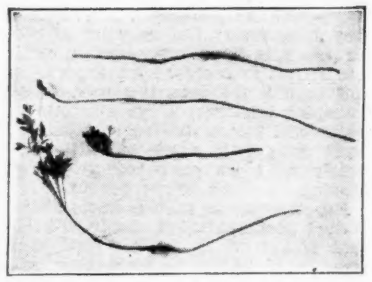


Figure 2—Stages in the development of a rhizome into a self-sustaining plant.

Propagation Has Been Difficult

The propagation of the "lowbush" blueberry has been a difficult problem. The plants are small with slender stems and fine roots (Figure 1). Various forms of stem and root cutting were made with very little success. Old plants seemed to be disturbed so much in transplanting that growth was feeble for two or three years. A close study of the plant showed that it spread naturally in the wild by means of underground stems or rhizomes (see Figures 1 and 2). These push out from a vigorous plant for two or three feet, turn up at the tip and develop leaves. Branches soon develop, fine roots appear and the new plant is well established and self sustaining (Figure 2). It was soon found that by separating these well established young plants in the early spring and cutting back the top to one vigorous shoot they could be handled readily and that about 85 per cent would grow. The

(*Concluded on page* 11.)

Winter Injury to Peaches in 1923-24

by W. A. Ruth and W. P. Flint

University of Illinois

DUE TO the successful experimental work in controlling the peach tree borer with paradichlorobenzene, this insect has been but little feared during the past two or three seasons. Nearly all commercial peach growers are depending on this method for the control of this most serious peach infesting insect, and upwards of a million trees were treated in southern Illinois during the past season. For this reason, reports of injury by this chemical in April, 1924, caused considerable alarm because of the large number of trees known to be treated.

The first reports of injury were received from Union county, Ill. A number of other reports came in later, all but one from the same section, this one coming from Johnson county. Within a few days, it was learned that similar injury had been reported from one or two sections in southern Indiana, and certain areas in Georgia. Investigation of the trouble was at once started by the county agents in those counties where the trouble occurred, and by representatives of the Experiment Station and the Natural History Survey.

Mr. Foote, County Agent in Union county, and Mr. Chandler of the Natural History Survey, spent nearly two weeks in carefully investigating conditions in the orchards where injury was reported. Later examinations were also made by the writers. Similar examinations were made in southern Indiana by Mr. Burkholder of the Horticultural Department, Dr. Porter of the Federal Bureau of Entomology, and J. J. Davis, Entomologist of the Purdue Experiment Station.

Injury Shown by Discoloration of Wood

The injury to the trees is shown by discolored wood of twigs, branches and trunk. The injury to the wood is not superficial, that is, it is not confined to the wood of 1923, in fact, the 1922 wood of two-year-old twigs is usually darker than the 1923 wood. Cross sections of the trunk of a badly damaged three-year-old tree showed brown areas extending irregularly throughout the wood of 1921, 1922 and 1923. This discoloration is typical of certain types of winter injury to peach trees. The bark and 1923 wood of larger branches and forks of the trees do not show injury. Where trunks are injured severely, there is a brown or dead area of bark, beneath which the wood is injured; this injury becomes apparent when a section of the bark is cut out. The injury to the trunk usually starts at, or just above, the ground line. In many trees, it extends from six inches to 18 inches above the surface of the ground, and from three to six inches below. Where roots ran laterally, within three inches of the surface, they were in most cases dead, at least on the upper sides, but where they dipped below the surface to a depth of eight or 10 inches or more, they were in all cases alive. In some cases, the external injury extended completely around the tree; in other cases, a small area was left uninjured. No side of the tree seemed to be particularly subject to injury. A point of considerable importance is that no injury has been found on one and two-year-old trees, while on the other hand, trees from three to 17 years old have shown severe injury. Experimental work with paradichlorobenzene applied in amounts above the recommended dosage, with the express purpose of inducing injury, have shown the damage to be more serious to young than to old trees.

Winter Injury Responsible for Damage.

Several good reasons are brought out above for discarding the idea that paradichlorobenzene could have been responsible for the damage. Twig injury, such as that described above, injury to the inner wood of the trunks, as well as to the external wood, injury to the trunk above the ground line, as well as below, and to superficial roots at a distance of two or three feet from the trunk, could not be attributed to paradichlorobenzene. These can all be attributed to winter injury. The assumption that winter injury is the cause is strengthened by the fact that the deep roots, protected to a greater extent from freezing than the superficial roots, were uninjured even next to the trunk.

All orchards showing bark injury at the ground had received late cultivation without a cover crop during the summer of 1923, or had been mulched, either of which would bring the trees into the winter with the wood in a very immature condition. Moreover, injury which was apparently identical was found in orchards which had not been treated with paradichlorobenzene. On the other hand, no injury to the bark or trunk of trees was found in orchards or parts of orchards where a good cover crop had grown which would remove the moisture from the soil and tend to harden off the wood of the trees, or where the orchard had been in sod, and no cultivation had been practiced. Whether or not these orchards had been treated with paradichlorobenzene, injury to twigs was noticeable in such orchards, but no injury was found below the surface of the ground or to the trunk (or forks) above the surface of the ground.

Weather Conditions Favored Winter Injury

The weather conditions of the winter of 1923 and 1924 were such that injury to peach trees might be expected to occur quite generally over the southern Illinois orchard districts. The fall months, with the exception of October, were above normal in temperature. The temperature of December was from 10 to 12 degrees above the normal for the area where the most severe peach injury is reported. During the first week in January there occurred a very sudden and severe cold period, the air temperature ranging from eight to 12 degrees below zero Fahrenheit, and continuing at a low level for about 24 hours. This condition would be sufficient to account for the extent and type of injury found in the peach orchards in the south end of the state. The occurrence of injury at about the ground line is probably to be accounted for by a higher water content. Tissues containing large amounts of water are easily injured by freezing. Such a high water content is to be associated with late cultivation or other conditions favoring late growth. It is scarcely conceivable that the injury may have been aggravated by the use of the paradichlorobenzene about the base of the trees. There is no evidence to show that this is the case.

The injury, with its contributing factors, resembles very closely injuries reported in previous years, in fact, it is probably identical. Any differences would seem to lie in the de-

(*Concluded on page* 16.)

Southern Peach Orchard Management

by J. R. Cooper

University of Arkansas

FEW CROPS respond more quickly, either favorably or unfavorably, to general cultural treatments than the peach. The peach grower who performs such operations as cultivation, fertilization, pruning and spraying in a thorough and intelligent manner, is sure of consistent profits over a number of years. The man, however, who neglects one or more of these "Big Four" operations, will suffer in direct proportion to his neglect.

Cultivation and Cover Cropping

Cultivation and cover cropping go hand in hand. Therefore, this might be called one operation. Cultivation loosens and warms the soil in the spring, increases the nitrogen supply by encouraging bacterial growth, frees plant food in general, aerates the soil and has many other beneficial effects. But the main and outstanding reason for cultivation is to conserve moisture, which it does by keeping down weeds, grass, etc., and maintaining a soil mulch. Each mature bearing peach tree requires during the growing season approximately 3000 gallons of water, that is, this much water must pass through the roots of the tree up through the trunk and either be utilized by the tree or pass out through the leaves during the season. The tree lives on the plant food which is dissolved in the soil water and that which it gets from the air. On soils which are low in fertility, the tree will require even more water than this for normal growth, while on soils which are rich in plant food, it may require less water. It will be well to remember in connection with this, that the tree also draws water in proportion to the amount of foliage it carries. A tree with very heavy foliage will require much more soil moisture than a tree with a light foliage.

The amount of normal rainfall throughout this section of the country is sufficient to supply somewhat more than three times the amount of water that a normal tree will require during its growing season. We are unfortunate in that a large portion of the rainfall comes early in the spring, while during the later part of the growing season the precipitation is very light. We must, therefore, store in the soil enough water to last the tree over that part of the growing season when there is little rainfall. Much of the early rainfall is lost through run-off and through leaching away. There is still plenty left, however, if we take care of it.

Weeds will use as much water as the peach tree, where they are allowed to grow in the orchard, and where thorough cultivation is not kept up, as much water will evaporate as the tree uses. This cuts down the moisture supply to the extent that trees cannot make normal growth. In some of the experimental work being carried on by the Arkansas Ex-

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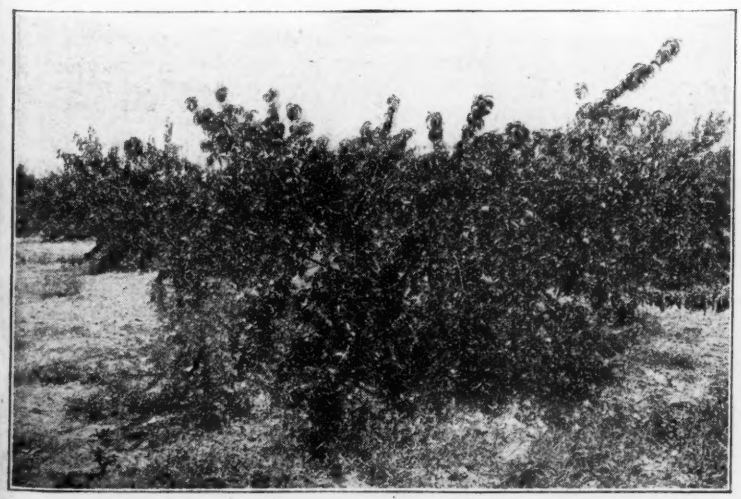

A well pruned tree. The fruit can all be picked from the ground.

Harvesting peaches in the Bert Johnson orchard at Nashville, Ark.

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Agricultural Conditions Improving

AGRICULTURE has been down in the valley of shadow the past few years, but there are indications which point toward better things. We do not mean that there are any indications that agriculture will soon be on an equal footing with other lines of industry, for that will not come about until our government reconstructs its viewpoint toward agriculture and makes some far-reaching changes that will assure food producers a fair share of the national income. But, at any rate, prospects for the near future are looking better than they have for some time.

In the first place, food production in general is going to be lighter this year than for many years. The government crop report for June showed the poorest crop prospects which have existed for 12 years. The July report was only a little better. Both the wheat and oat crops will be below normal. The corn crop, because of cold, wet weather in the Middle West, promises to be decidedly short. Early in July it was only knee high, when ordinarily at that time most of it is laid by. Already there are worries of damage from early fall frosts, and soft corn is feared in any case. The hog prospect is below normal. Such conditions are almost certain to stiffen the demand and prices for farm products.

There are reports from Europe of serious drought in the whole Mediterranean region, including North Africa, Spain, Italy, and extending over into the wheat region of lower Russia. These conditions are likely to strengthen the export demand.

In this connection, it must be remembered also that economic conditions in Europe have gradually been improving, that the German mark has been strengthening in value, that a financial crisis has apparently been averted in France, and that the adoption of the Dawes plan will in all probability improve European conditions in general. If the Republican party should be placed in power in this country, with Dawes as Vice-President, it is quite likely that the government will be more or less favorable toward the working out of the Dawes plan.

Along with these conditions, there are some adjustments taking place in this country which seem favorable toward agriculture. Employment has fallen off somewhat and a better supply of labor is available for farmers at lower prices. The prices of supplies used by farmers have gradually been decreasing and conditions indicate further movement in this direction.

These matters may seem remote from fruit growing, but we must remember that fruit prices tend to move with the prices of food products in general. Factors which raise prices of grain and meat are bound to have a more or less favorable effect on fruit prices. The crop reports indicate a good fruit crop as a whole. The shortage of other food products will no doubt help fruit growers materially in disposing of this large crop. It is unfortunate, of course, that conditions are somewhat spotted and that some growers and some sections will not have a good crop.

It looks to us like a good time to be giving the fruit crop good care, so that the largest possible portion of quality fruit may be produced. We believe it is a good time to be preparing to save as large a portion as possible of the off-grade products by canning, dehydrating, manufacture of fruit juices, etc. Farm women will do well to can a good supply for the home. Fully as important, we believe it is a good time for growers to be organizing themselves more effectively, so that they may most efficiently take advantage of the opportunities which seem to be coming. Finally, we believe it is no time to become reckless and extravagant in expenditures in anticipation of better times. Rather, we believe fruit growers should continue to practice sound economy and keep their feet solidly on the ground.

South African Competition in England

IT IS reported that the South African Fruit Growers' Union is laying plans to open retail shops in London, so that its products, including fruit, tobacco, jams, jellies, preserves, wines and other commodities, may be displayed for sale to consumers without losing their identity.

There is food for thought in this movement for American fruit growers. South Africa, from all reports, seems particularly adapted for fruit growing. At any rate, a large variety of fruits is grown and the production is pretty well distributed the year around. The production of fruit is increasing. Furthermore, the growers are well organized, and the government seems to be favoring grower cooperation much more than the government of the United States is favoring it here.

In regard to the proposed retail stores in England, there are many of our people who would hold that such a proposition will not work. No doubt it would be extremely difficult and perhaps impossible for such a system to succeed in this country under present conditions. But we must remember that in England the Rochdale system of consumer buying has been a great factor in educating public opinion, and that therefore such a movement will probably not meet with the obstacles it would face in this country.

South Africa is a province of Great Britain and it is to be expected that the English public and the British government will be as favorably inclined toward the development of the proposition as they legitimately can. Since the United States exports large quantities of fruit to England, it is obvious that such a movement, if it succeeds, may encourage English consumption of South African fruits at the expense of American fruits.

American fruit growers can meet whatever opposition such a movement may afford, but they must meet it on business principles. We grow a large variety of fruit in the United States and, with the help of ample storage, we can supply it to English consumers practically the year around. We have two important advantages over South Africa so far as British trade is concerned: The transportation distance is shorter from our producing sections to England, and the fruits do not have to cross the Torrid zone on the way. Notwithstanding these advantages, we must furnish the English people with quality fruit, at reasonable prices, if we are to successfully meet the coming competition of South Africa, no matter whether the retail shops succeed or not.

To accomplish these ends most effectively, we must have more thorough grower organization and co-operation than has existed to date. Some groups of growers are sufficiently well organized that they can successfully meet all competition in England, but others are not. In view of the quality and variety of fruit grown in America, our growers can, if they will properly organize themselves, meet any competition which the proposed retail system, or any other system, may offer in England. Quality, service and reasonable prices will talk to the English public the same as to any other. These objects can best be achieved by more thorough grower organization and co-operation.

Paradichlorobenzene Vindicated

THE PEACH tree borer has been a serious menace to peach growing. Paradichlorobenzene, since its introduction a couple of years ago, has proved a tremendous help in controlling this serious pest. In fact, it has provided practically a 100 per cent control for the borers, and the work of application has been as nothing compared with the laborious task of digging the borers out of the trees by hand, not to mention the damage done to the trees by the digging. Growers who have used P.D.B. have to a large extent quit worrying about the borers. The method of control has certainly lifted a great load off the minds of peach growers.

With these facts in mind, it was a serious disappointment to most growers when persistent reports came from several states this spring to the effect that P. D. B. had badly damaged the trees.

The American Fruit Grower Magazine is pleased that it can present in this issue an article by Dr. Ruth and Dr. Flint, showing conclusively that the report was unfounded and that the damage was due to winter injury rather than to P.D.B.

This incident sets forth clearly two imporant matters. In the first place, it shows how easily we may be misled by false reports and thereby draw wrong conclusions. The technique of practical fruit growing is highly developed. Changes in methods are constantly taking place. Improved methods frequently replace old ones. Weather conditions and the delicate process of plant life often make it difficult to correctly diagnose a case and place together the proper causes and effects. With such facts in mind, we must be cautious about drawing final conclusions before we are positively sure we are right.

Secondly, this incident is a fine example of the kind of service experiment stations are giving the fruit industry. Dr. Ruth and Dr. Flint, as well as workers in other states, jumped onto this problem virtually the moment it arose, and by means of their training and experience, quickly dug out the facts and gave them to us. In this way they set us back in the correct paths of thought before the effects of the false reports had become deep-seated and probably before any one had discontinued the use of P.D.B. and suffered loss as a result.

Some people think that colleges and experiment stations cost a lot of money. It is impossible to estimate how much one piece of service like the one mentioned is worth to the growing and consuming public. It is only one of many similar incidents that happen yearly in the life of every experiment station.

Sundrying California Fruits

by Myer J. Heppner

University of California

CALIFORNIA is known the world over for its dried fruits, especially prunes, apricots, peaches and pears. Each year tons of these dried products are shipped to all corners of the globe, where they are used as staple products by the many peoples of the universe. All foreign countries look to California to supply them with its high quality dried fruits. Not only is this true with foreign countries but also with the various states of our own union.

Although dried fruits are used by all nations of the world, as well as by our own country, very few people are acquainted with the processes used in sundrying fruits. Many people have the misconception that all that is necessary is to pick the fruit, place it in the sun and then ship it to consuming points. However, this is far from the truth. It is the object of this article to give a treatise of the methods commonly employed in California for fruit drying. The equipment necessary for sundrying will first be discussed and then a somewhat detailed discussion taken up dealing with the drying of each kind of fruit.

The Dry Yard

Most California orchards where sundrying is practiced generally have a large open field in which the fruit is dried, termed a "dry yard." This yard cannot be used for anything except a crop which can be taken off before the drying season begins. It is a common practice to sow grain in the dry yard and cut previous to the drying season. The remaining stubble makes an ideal cover for the ground. About one acre of dry yard is required for each 20 to 30 acres of bearing fruit trees. Instead of keeping an open dry yard, many growers utilize the space between the trees for drying purposes. The advantage of this is that no ground is kept open for drying purposes, but the disadvantages are that drying is generally slower due to the shade cast by the trees and the difficulty of working between trees.

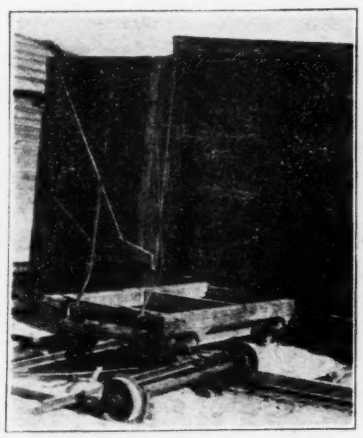
Most dry yards are equipped with a system of tracks, turn tables, transfer trucks and tray cars. These are used for transferring the fruit from the cutting shed to the field for drying. This equipment is not used on small orchards but instead one generally finds some form of sled or wagon equipment for moving the fruit from the shed to the field. Up-to-date orchards are equipped with steel tracks, which are permanent and more serviceable than the nearly obsolete wooden tracks.

Some sort or type of cutting shed is found on all orchards where fruit is dried. Many orchards now use up-to-date concrete cutting sheds; others still use the original type of wooden frame buildings.

Sulphuring the Fruit

All deciduous fruits, with the exception of prunes, are sulphured before drying. This sulphuring is generally done after the fruit is cut. The reasons for sulphuring are as follows: It bleaches the fruit, acts as a disinfectant and preservative, kills all forms of insect life, prevents darkening of fruit and aids in drying by breaking down many of the cells. Unless fruit is sulphured before drying, the resultant product will generally be dark and unattractive. Although it is often claimed that sulphured fruit is injurious to the human system, there is no data to substantiate this statement. To be true, a small amount of sulphur is retained by the fruit but not in large enough quantities to affect the consumer.

The fruit is generally sulphured in specially constructed sulphur houses. Best results are secured from houses constructed of brick or concrete, as little fume leakage occurs with this type of structure. The houses vary in size but in general are made large enough to accommodate about 25 to 30 stacked trays of fruit. A pit is generally used to hold the sulphur. After the fruit is in place, the sulphur is ignited and allowed to burn the proper length of time before the door of the house is opened. Most sulphur houses are nearly air tight.



Wooden sulphur house loaded with trays of fruit. The two trucks are used for moving the stack of trays. The upper truck is the transfer truck.

Scraping the dried fruit into sweat boxes. These boxes are sometimes used for sweating purposes instead of bins. Note paddle used in scraping.

The trays used in sundrying vary in size from two by three feet up to three by eight feet, depending upon the type of fruit dried and preference of the grower.

Fruit Must Go Through a Sweating Process

After fruit has been dried in the open, it is put through a sweating process so as to equalize the moisture content of all the fruits. The common practice is to take the dried fruit from the field and dump it into large bins, where the fruit is allowed to remain until the sweating is complete. The time necessary for sweating varies with the uniformity of drying in all the fruits.

Besides the above equipment, the following is also necessary for fruit drying: Big boxes, cutting knives, cutting tables and experienced cutters, usually women and girls.

A discussion will now be taken up of drying the various kinds of fruits.

Apricot Drying

There are four varieties of apricots which are generally used for drying purposes, namely, the Royal, Blenheim, Tilton and Moorpark. These are also used for fresh shipment and canning. The Royal and the Blenheim are generally grown in the coastal valleys, while the Tilton is best adapted to the hot interior valleys. The Moorpark is a shy bearer, but is dried due to the large size attained by the fruit.

When the apricot is to be dried, it is picked when firm ripe, but not overripe. Some growers practice knocking the fruit from the tree onto a canvas spread on the ground, but this is not generally recommended due to the large number of fruits bruised. After picking, the fruits are placed in lug boxes and hauled to the cutting shed. Here the fruit is cut in half, the knife blade following the suture of the fruit. The pits are removed and dropped into a box, the cut fruit being placed on the drying tray, cut face upward. After the tray has been completely covered with a single layer of fruit, it is placed on the car which is to transfer it to the sulphur house. When the car has the proper number of filled trays on it, it is placed in the sulphur house, where the fruit is sulphured. About eight pounds of sulphur are used for each ton of fruit. As a rule, apricots are sulphured sufficiently in three hours, although longer periods are required if the fruit is under-ripe or if there is a bad leak in the sulphur house. However, the time allowed for sulphuring generally varies with the grower, although three hours is sufficient in most cases. A good indication when sulphuring is complete is when the cup of the fruit is nearly filled with juice.

After sulphuring, the carload of trays is removed to the dry yard, where the trays are spread one deep. The time necessary for drying naturally depends upon the weather. Two dry, warm, sunny days are often sufficient for the apricot, but on cloudy, sultry days, a longer period of exposure is necessary. Final drying is allowed to take place in the stack, that is, after the proper exposure in the sun. The trays are stacked in order to give a slower drying and hence prevent the hardening of the fruit Drying is complete when the fruit is soft and pliable, but not sticky. If the fruit is allowed to dry too long, it becomes hard and brittle, thus making a poor product, which goes into a lower grade than first-class fruit. After drying, the trays are scraped and the fruit put into sweat boxes. Sweating generally requires about two weeks' time. It is here that the grower's work ceases. All that remains is for the fruit to be transported to the warehouse, where it is graded, cleaned and packed and then distributed to all parts of the world.

Peach Drying

There are several varieties of peaches dried on a commercial scale, three of them being of major importance, the Muir, Lovell and Elberta. Other varieties that are of importance are Foster, Salway, Early Crawford and Susquehanna. Practically all peaches dried have yellow flesh and are freestones, no clingstones being used for drying purposes. Many of the above varieties are also used for fresh consumption.

The fruit is hand picked from the tree when firm ripe. The cutting process is similar to that used for apricots.

Owing to the large size of the peach, it requires more sulphuring than the apricot. About eight pounds of sulphur are used per green ton and the time for sulphuring is about four hours upwards, depending upon the ripeness of the fruit.

Many growers turn out a dried peach which is peeled. This is done by immersing the cut fruit in boiling lye water, then agitating the fruit. This removes the skin and gives a higher grade product than the unpeeled fruit.

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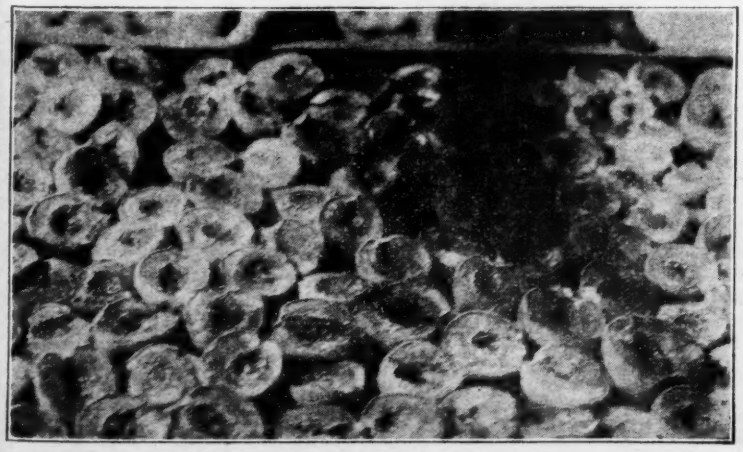
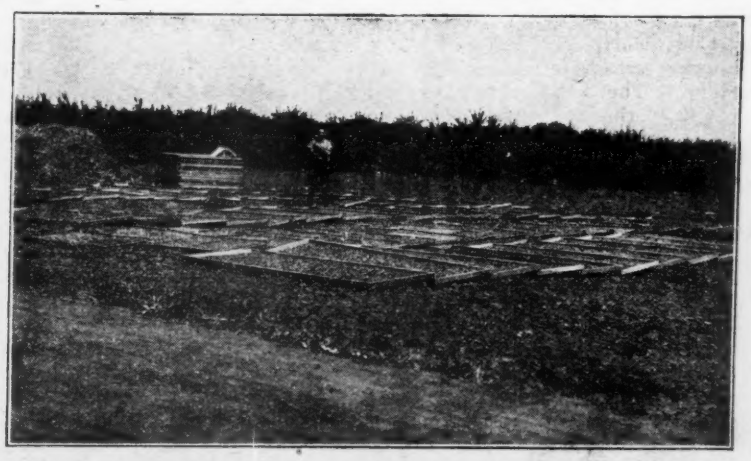


Method of placing peaches on tray for drying purposes.



In order to give maximum exposure to the sun, the trays are not placed flat on the ground but rest on the tray directly in back.

Development of Early Apple in Tennessee

by J. L. Baskin

WHEN the pioneers crossed over the mountains from Virginia and the Carolinas, they settled in the broad, fertile valleys which they found suitable to the growing of field crops and live stock. It was not until these valleys had been occupied that the people began to push back and settle on the hills and plateaus. As they began their development of these high lands, they naturally attempted developments similar to those in the valleys. During these early days land was far too plentiful to consider intensive farming of any kind.

It was not until about the year 1900 that the people of Tennessee began to consider fruit growing as a profitable vocation. During this year, a great orchard planting boom swept over the country and Tennessee was in its path. Prior to this time men owning less than 400 or 500 acres of land were not considered progressive farmers. The state being developed on such a scale, it is easy to understand why fruit growing, which is an intensive branch of agriculture, did not gain earlier recognition. During this widespread boom, many people planted orchards, expecting great profits in a short time.

The people that interested themselves in the furtherance of this boom had very little as a precedence on which to base their claim of great profits. Their message was a story half told. There were great profits from fruit growing then and there are even better ones today. It is not the lack of natural advantages, such as climate, marketing facilities, suitable lands and transportation, that is curbing fruit development in Tennessee today, rather it is the ghost of the forefathers hovering over the generation of today. Too frequently we find farmers who are willing to plant an orchard, but when you mention modern practices, they readily cite you to the fact that their fathers used to grow excellent fruit without spraying, pruning or fertilizing. Again, other farmers desire to plant as large an acreage in orchard as they would were they growing field crops, the result being that they find themselves with more orchard than they can properly care for.

A Well-Laden Transparent Tree That Has Consistently Borne Good Crops

Packing Scene in Tennessee

Reaction Sets In

As a result of this boom, many people planted orchards that were unable to properly care for them until they could be brought into bearing. Few people in this section of the country had any conception of how to properly care for a commercial orchard and this caused many orchards to fall into ruin. Many of the planters had heard only the bright side of fruit growing, and when they began to learn the battles and hardships that the fruit grower had to contend with, they again took up general farming, deserting orchards that would have been profitable had they been properly cared for. So serious was this reaction that large acreages fell into ruin, leaving only small orchards in well defined districts.

The Process of Elimination

After an elapse of 10 or 12 years, the hand of nature was felt in districting these plantings. Where crops could be secured regularly, the orchards were kept in good condition and are bearing today. There are other areas which were not so favored by regular crops and they have passed out of existence. It is a well recognized principle that regularity of crops is frequently the determining factor in profitable fruit growing. Securing regular crops had a great weight in forming the present fruit districts in Tennessee.

The Blunder of Variety Selection

Even in these surviving districts, many growers began to realize that certain varieties yielded more abundantly and more regularly than did others. Throughout every district the growers realized that they had planted entirely too many varieties for commercial orchards. This was, no doubt, due to the fact that the growers had gained their knowledge of varieties in home orchards where it is desirable to have a succession ripening from early to late. The reverse is true in the commercial orchard, and the growers now realize that they should plant only two and not more than four varieties. Just as they found that some varieties yielded more abundantly and more regularly than others, they also found varieties varying in susceptibility to fungous diseases, such as scab, bitter rot, blotch and black rot, and this had much to do with the final selection. When the growers commenced placing their fruit on the market, they found that certain varieties arrived in much better condition than did others. They also learned that varieties ripening in the early season brought higher prices.

Survival of the Fittest

Today the process of experimentation and elimination has just about run its course. Instead of these varieties having been tested by the experiment station, as they would be under present conditions, they were scattered throughout the state. This made the experiment very costly to the growers and caused one to fully realize that "experience is a dear teacher." However, the various apple districts are pretty well defined. The growers are learning the demands of the market; they know the varieties that yield abundantly and regularly; they know shipping qualities and the price that the market will pay for good apples. They have learned

(*Concluded on page 22.*)

Growing Peaches in More Northern Sections

by J. H. Gourley

Ohio Experiment Station

THE OBSERVATIONS on peach culture set down in this article relate largely to conditions in the state of Ohio but apply to a considerable extent to others of the more northern region where this fruit is grown. This presumption is made because the writer hears similar remarks for and against peach growing in his occasional visits throughout the northeastern states, and it is therefore assumed that the growers have somewhat similar experiences over a period of years.

If we except certain well defined regions, it must be accepted that the peach is not a very hardy fruit to grow in this general region. Its weakness is shown in any test winter by a killing of the fruit buds or injury to the twigs, roots or trunk, or a killing outright of the entire tree. The immediate cause of such injury may not be clear and often there are several adverse factors working together. But just as it is more tender than most other fruit plants of this region, it also has surprising powers of recovery if the balance turns slightly in its favor when growth starts in the spring. But the fact that the trees may do well and be fruitful two, three or more seasons in succession, encourages their planting and it becomes general. Also their early bearing habits, their rather semi-tropical nature and their fine quality tempt one to try again, even though their record for some previous period of years was bad. This somewhat erratic behavior is mentioned in order to point out the special requirements of this fruit and also to suggest where it may have been planted to little purpose under some conditions.

The Districts

Ohio, like some of the other eastern states, does not have large, well defined fruit regions, but in the main they are well scattered over the state. The best known and most contiguous section lies east of Port Clinton in Ottawa county on Lake Erie. This section is ideally located because of the water protection and it has a record of 20 consecutive years without a crop failure. This lake region extends in a broken and irregular way eastward to the state line. The other sections where peaches are grown in a commercial way are in the eastern part of the state, sometimes referred to as the Pittsburgh district; in the south and southeastern part; in the extreme southwestern section, and in the central counties.

Practices differ somewhat in these sections, in fact, in a radical way with regard to certain of them. The peach

(*Concluded on page 10.*)

An Ohio Peach Orchard Before the Spring Pruning

An Extreme Type of Pruning with a Consequent Low Yield

XUM

Why Are Leaves Green?

by E. L. Proebsting
University of California

THE GREEN coloring matter in leaves is associated with the processes by which the plant makes food out of raw materials. Anything tending to reduce the content of this green material, chlorophyll, in the leaves is, therefore, a check on the production of these foods.

In general, dark green foliage is the type desired for the best results in the orchard. There are a number of factors that interfere with it. One of them, resulting in light green or yellowish leaves, is an improper balance of nitrogen in the soil. Too much or too little; but especially too little may give rise to this condition. The remedy in the case of too much nitrogen is to stop fertilization and perhaps to grow an intercrop to use up the excess. The other extreme is much more common. When nitrogen is deficient in an orchard, manures or nitrogenous fertilizers should be added, or leguminous cover crops grown.

Another common cause of chlorosis, or lack of chlorophyll, is a deficiency of iron. This may be due not to a lack of iron in the soil but to its occurrence in a form that is not available to the plant. For example, alkaline soils, or those very high in calcium, may have the iron precipitated in the soil in an insoluble form. The plant cannot take up the iron except in solution and therefore may starve for this substance. A few crystals of ferrous sulphate (green vitriol or copperas) placed in contact with the roots will remedy this condition.

The lack of magnesium is another cause for chlorosis. This substance forms part of the green pigment, which is unable to develop without this element. While this is not common in orchards, the mottling of the leaves is sometimes attributable to it. Magnesium is present in many marls and limestones, and may be added in this way when deficient.

The light green color noticed so often in trees that have been suffering from lack of water is probably due in most instances to a lack of nitrogen. This may be due not to a deficiency of this element in the soil, but to failure of the roots to procure it because of the dry condition of the soil. Light green or mottled leaves are usually an indication of improper nutrition and should be a warning to the grower to remedy the unfavorable condition.

A MATTER which may in time be of some importance to American fruit growers is the fact that Argentina is making serious efforts to find practical ways of shipping fruits into the United States. A two-year trial has now been made and last year's results proved better than those of the previous year, in fact, Sr. Videla of the Pacific Railroad of Argentina, who recently published a report following an investigational trip to the United States, claims that the exportation of fruit to the United States "is no longer an experiment but may be considered sound and permanent."

Many problems which presented serious obstacles at the start have been met, according to this report, such as the kind of containers necessary, the correct methods of grading and packing to meet American demands, and the refrigeration temperatures required for successful ocean transportation. However, it is reported that the largest remaining problem is that of finding improved methods of assembling the products at the ports of export in Argentina.

The best available data indicates that 1,000,000 pounds of Argentine fruit were shipped into the United States in 1923, consisting of 22,000 pounds of peaches, 81,400 pounds of prunes, 81,400 pounds of melons, 33,000 pounds of pears and 900,000 pounds of grapes.

To date, the products have all been consigned. Selling f. o. b. steamer at port of export is not expected to be possible until the fruit is better known in the United States and until buyers have sufficient confidence in the grade and pack.

While we recognize the right of Argentine growers to ship fruit into the United States if they can overcome the difficulties involved, we feel there may be some danger of importing serious fruit pests into the United States in this way and it is a proposition the Federal Horticultural Board should watch very carefully.

In this connection, it is important to repeat the report made in last month's issue that the Board on January 19 ruled against the further importation of Malaga grapes from Spain into the United States on the ground of preventing the entrance of Mediterranean fruit fly. Since the shipment of these grapes from Spain into the United States totaled 350,000 barrels in 1922, the matter is of considerable economic importance to American grape growers in these times of large fruit production.

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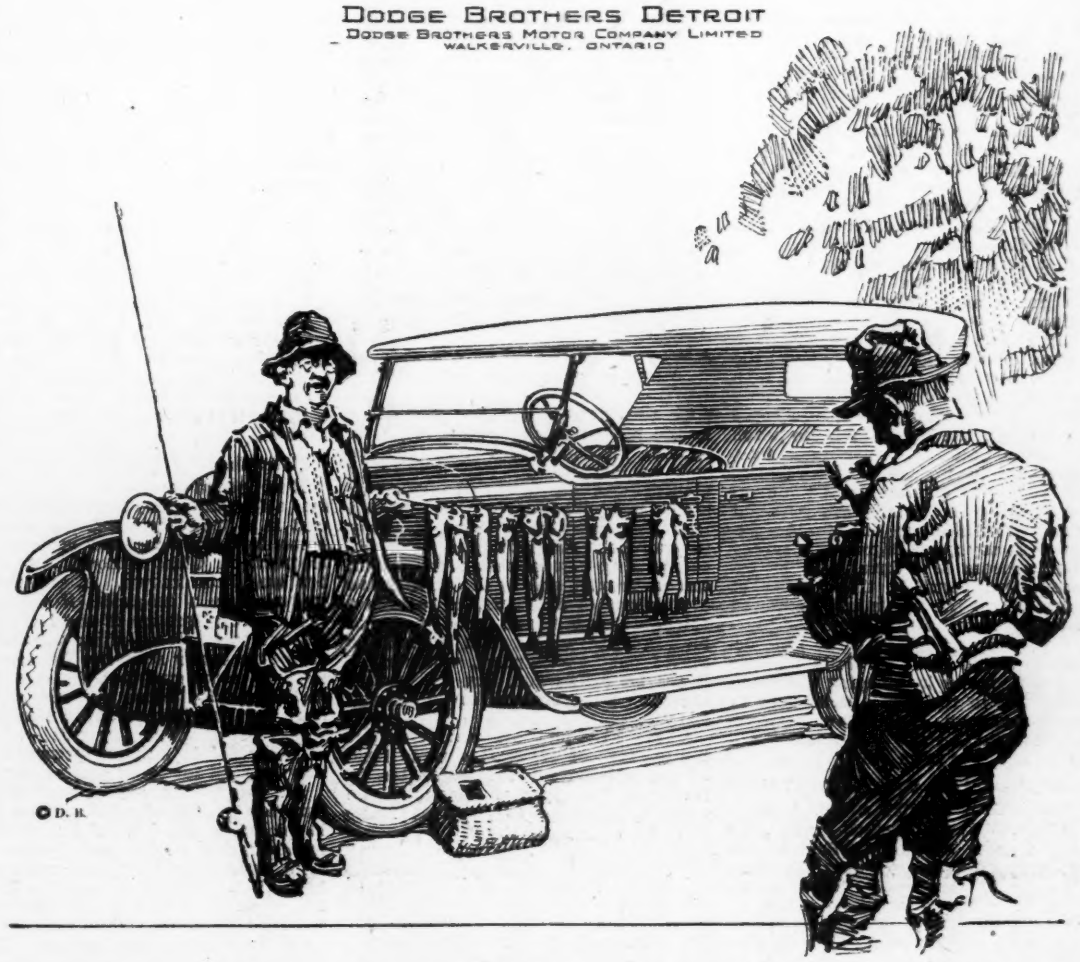

Pennsylvania Peach Shipments

PENNSYLVANIA shipped more peaches in 1923 than in any previous year in which records were kept, reports P. R. Taylor, Director of Bureau of Markets. The records show that 615 cars were shipped. Franklin county led with 268 cars, or about two-fifths of the total. Montgomery, Birks, Adams and York counties also shipped a considerable quantity. Ten cars were loaded in July, 255 in August, 345 in September, and five in October.

ROADSIDE planting of fruit trees has received prominent attention in England of late. The government has gone so far as to promise to introduce a bill authorizing the use of the Road Fund for the purpose and to empower local authorities to spend money for roadside planting.

The Fruit Grower of England has expressed itself against the proposition, chiefly on the ground that too much inferior fruit is already grown and that roadside planting will simply add to the number of trees which as a whole will not be very well cared for.

XUM

Growing Peaches in More Northern Sections

(*Continued from page* 8.)

is fickle in its behavior and even in these more favorable regions it is not uncommon for growers to change front completely in regard to the advisability of planting it on more than a limited scale. The best sections are gradually being determined by experience and the others are being eliminated. But a crop failure or two, or even injury to the trees from low temperature, does not necessarily prove for all time that the orchard site must be abandoned. The peach grower in the north must realize that the peach is tender and that loss will occasionally be experienced in nearly all the favorable sections, and in the unfavorable locations more hardy fruits or other crops will eventually replace the peach.

New plantings are gradually replacing the maturing trees, but frequently some diversification is being practiced where formerly only peaches were grown.

Peaches as Fillers

It has become an established practice to plant peaches as filler trees in the apple orchard. The motive is clear and commendable, for every orchardist wants quick returns and desires to utilize his land as fully as possible. The manager of the "company orchard" has the same thing in mind for he foresees the day when members of the company may become impatient and want to see something coming in. As a result of this general practice, we find peaches planted under some very unfavorable conditions. Sites and soils that will produce apple trees may fail for the peach, as this fruit is more sensitive to poor drainage and heavy texture of soil, as well as low temperatures, than the hardier apple.

If a census could be taken of the experiences of those who have used the peach as a filler in the apple orchard, it would unquestionably show many failures, or near failures. Unfavorable climatic factors play the largest part in such failures, although disease and insect pests, and improper soils and cultural methods, also score heavily. On the other hand, the peach has often paid well as a filler tree, sometimes paying the original cost of the land and considerable of the overhead during the first seven or eight years. Probably no one could forecast with any great degree of accuracy when success or failure is to be expected, but certainly the number of cases where the apple trees suffered and no returns accrued from the practice is sufficient to cause the prospective planter to study carefully whether he can do better by planting the peach as a filler in the apple orchard or in many cases cropping the land between the permanent rows and planting fillers in the tree rows only.

Shall the Peach Orchard be Tilled?

This will seem like a foolish question to the average peach grower, for what greater heterodoxy than to follow any other system than thorough tillage with the peach. There is no other tree fruit commonly grown in the East that will show such a striking response to cultivation. Side by side with the apple, the comparison is striking, although the former also is responsive to such treatment. Under many (perhaps most) conditions, lack of tillage means very inferior results and early death of the trees. Yet, as one's experience widens in the growing of plants, he realizes that few unalterable laws can be laid down, for surprising exceptions to many of them will be discovered. It is easy to ignore the exceptions or dismiss them with skepticism, but such a habit of thought is at least provincial.

Granting that the peach requires thorough and annual tillage, let us look at an exception or two. In the extreme southern part of Ohio, as far away from the lake district as we can go, there is the second largest planting of peaches in the state. Here it is not uncommon to find peach trees 15 to 20 years of older on hillsides or in coves so steep or inaccessible that they have never been tilled and yet bear with fair regularity. Even borers have not been so bad as might be expected, although scale, leaf curl, yellows and brown rot have taken their toll. If such a practice adds to the yearly income when the land could produce nothing as profitable, who shall condemn it? This section is not a big factor in the peach market, broadly speaking, yet it supplies a large amount of fruit in a crop year.

Another example may be taken from the Port Clinton district where cultivation has been practiced with a vengeance. W. C. Yule, of Danbury, came to realize that his trees under tillage had many mechanical injuries on the trunks and larger branches as a result of single-trees and implements striking them. He leased one orchard to a neighbor, but later protested that the trees were being badly damaged by striking them during the process of plowing and cultivating, but the neighbor insisted that he never struck a tree. Mr. Yule replied that the trees

A View in the Orchard of Wm. C. Yule, Where a Clover Sod Is Maintained

must then get up and kick each other in the night. Such wounds made an opening for borers and other troubles and he decided to put his newly planted orchard in sweet clover or alfalfa sod. The soil is well supplied with lime and these crops are easy to establish and maintain. The accompanying figure shows the clean, smooth trunks, and by the further use of sulphate of ammonia, he secures a splendid growth and good yield of high quality fruit. The orchard is disked once each spring, which gives it partial cultivation, but the rest of the season the orchard cover has full sway.

These examples are not given for the purpose of advocating some form of sod culture for the peach but to illustrate the greater elasticity we have in handling the various fruits than we commonly think.

Fertilizers

Without going into a discussion of the whole problem of orchard fertilization, it may be said that from our present knowledge we recommend the use of stable manure at the rate of about 150 pounds, or nitrate of soda four to five pounds, or sulphate of ammonia three to four pounds, to the mature tree to give maximum returns in most orchards. The vigor of growth and amount of foliage, together with the proper ripening and coloring of the fruit, must be the guide as to the amount to use. Prof. B. S. Pickett has reported some striking results from the use of potash on peach trees in Illinois, but so far as experiment and observation go in Ohio, these results have not yet been duplicated. Acid phosphate, or lime, or both, may be necessary to produce good cover crops, but are of little direct benefit to the trees themselves.

An example may be cited of one block of 600 Elberta trees now eight years old which has been fertilized as indicated above and has had good tillage but only moderate pruning. This block of trees produced 4600 bushels of marketable fruit last year, or upwards of eight bushels to the tree. The fruit was nearly all of AA grade, there being very few fancy or B. The orchard has been a consistent producer of large crops in contrast to neighboring orchards that have lacked fertilization. In a season when the fruit ripens pretty much at one time, an advantage has been gained where a heavier application on a part of the trees had been made, thus holding the ripening back and hence lengthening the picking season.

Varieties

The commercial sections find it most profitable to plant the standard, well-known sorts, although in the various local sections there is often some preference for a less well-known kind. As a rule, the late, yellow-fleshed, freestone varieties prevail, such as Elberta, J. H. Hale (to a limited extent), Lemon Free, Smock and Salway. Varieties much earlier than Elberta have usually not been money makers even though they produce well. Early Elberta is coming in to a considerable extent and it has some good qualities. Some seasons it is nearly two weeks earlier than Elberta and in others it is just barely ahead; or is it the soil or location that makes the difference? In a season like the present one, the Carman and Champion make a place for themselves, for many an orchard is bare of fruit except for these hardy white sorts.

Among the lesser known kinds that are being planted to a considerable extent, particularly in the lake region, are the Wilma and Salberta, both of local origin. The Wilma is a yellow freestone, ripening just after or sometimes with Elberta. Salberta is a high quality yellow peach that ripens about 10 days after Elberta and will eventually make a name for itself, at least for local markets. Shipper's Late Red is highly regarded in a few local places where it has been tried. It ripens with Elberta or slightly before and is of fine appearance and quality and seems to be distinctly hardier in bud than Elberta or Hale. Some growers consider this one almost identical with Elberta.

Spraying for Shipping Quality

Most peach growers have learned that a dormant spray for scale and leaf curl is a necessity. But the summer spray for brown rot and scab is less frequent in Ohio, although its value has long been known. In addition to its value as a fungicide, it improves the shipping quality of the fruit in a marked way. Some of the most skeptical of summer spraying for peaches are now convinced that the best fruit at the packing house has had a thorough spraying two or three weeks before picking. The dry mix, or any of the wetable sulphur preparations, may be used for these summer sprays.

An interesting experience on the carrying quality of well sprayed fruit is related by Mr. Yule of Danbury. A man working on his place wanted to send some peaches to his mother in Ireland. They packed 25 choice Elbertas, freshly picked from the trees, wrapped them in cotton and packed them in a cardboard carton. They were held up in the Custom House in New York because they were perishable, but were finally marked "for experiment" and passed the officials. In 21 days they were received on the other side in perfect condition, according to the correspondence. A similar small shipment was made to California with equally good results.

Where soil and climatic conditions are favorable and the essentials of good culture are followed, Ohio is producing a peach of high quality, and despite "off" seasons and marketing difficulties, she will stay in the game and continue to find it profitable.

Speaking of canned fruit, Francis Fewclothes says: "We eat all the fruit at our house we can, and what we can't, we can."

Good Fertilizer Makes Crops Good

by Rich Lucas

LAST spring on April 19th, I was walking through my vineyard when I conceived an idea of improving my vines for a greater and better fruit harvest. The vines had been well pruned and the vineyard had already been cultivated once, so it was in good shape, yet as I looked over the vines I wondered why a good application of commercial fertilizer would not make me more money used on my grapes (a crop of high acreage value) than it does on my corn, potatoes and other crops. The idea appeared so feasible that I went to the barn and brought out some nitrate of soda, which I applied at once, broadcasting from row to row and from vine to vine in the rows, applying 200 pounds to the acre, working the plant food into the soil so that it could commence its feeding and nourishing as soon as the plant roots became active. I did not apply nitrate to all my vines, leaving some unfertilized so that at harvest time I could see just what my grapes did with and without plant food.

Most of my vines are Concords, although I have a number of others for home use, such as Delaware, Agawam, Catawba, Moore's Early, etc., and I am testing out some Scuppernongs and Muscadines which I secured while on a visit in southern Texas.

The unfertilized grapes yielded 1.18 tons per acre with an increase to 2.76 tons where I used nitrate of soda, so why shouldn't I follow a routine with my grapes that has proven so remunerative on this crop?

Almost every farmer raises corn or small grains, crops repaying lightly for money and work expended on their production. Last year my best grapes repaid at the rate of $276 an acre and $118 for those unfertilized, so it would appear to me that while every farmer cannot be a commercial viticulturist, a great many could very profitably drift into the grape game by commencing with an acre, or fractional portion, and produce quality grapes, for if properly cared for, I believe a portion of an acre of grapes will make more clear money for the grower than is now being made on large fields of wheat, corn, oats, etc.

In starting a commercial vineyard, I would plant Concords, although I would plant, say, 50 other vines for home consumption, in which I would include Delaware, Moore's Early, Catawba, Agawam, Diamond, Niagara, Lutie and possibly a few other varities further thought would recommend. The varieties I have mentioned are good table grapes, will ripen early to late in the season, and will give fruit of all three colors, which makes a pleasing appearance when all three are grouped upon the table together.

New Citrus Co-operative at La Vern, Calif.

A NEW local co-operative association for handling citrus fruits was recently organized at La Verne, Calif. The following growers of the district were elected as directors for the first year: T. J. Stevens, E. R. Blickenstaff, D. F. Shrock, Harry D. Putnam and Ernest Richter.

Growers representing a large tonnage have already contracted to sell their crop to the association. Plans are under way for the erection of a modern packing house. The association is incorporated on the non-stock, non-profit plan and each grower is allowed one vote regardless of his acreage. The association is to be a unit of the Mutual Orange Distributors.

Theodore Roosevelt once said that he never worried about a man who got knocked down, so long as he got up again. If Roosevelt were living, he probably would have a high respect for the fruit growers and farmers of the United States since their experiences of the past two years.

Trying to Tame the Blueberry in Minnesota

(*Continued from page 4.*)

only obstacle remaining is that a "mother" plant will form only three or four rhizomes in a season. This seriously retards the propagation of selected strains. Further studies are being made to see if rhizome formation can be increased or some other more rapid method of propagation discovered.

As soon as a fairly satisfactory method of propagation had been found, the selection of superior wild plants was begun. The great majority of wild plants are ordinary or inferior in yield or quality. Some promising wild plants have been located and are now being grown at the Forest Experiment Station at Cloquet. These selections apparently have held their good qualities under cultivation, but propagation has been slow.

Plants Thrive Best Under Cultivation

Field cultural methods have been studied along with other phases of the work. Small plots in the Forest Nursery were used (Figure 3), and the treatments included no care after planting, cultivation, half shade, peat mulch, manure mulch and watering in various combinations. Manure and neglect quickly proved injurious. The plots under cultivation or peat mulch showed the best plant development and best yield. Based on these results, subsequent field practices have included thorough preparation of the soil, disking or plowing in a liberal top dressing of peat before planting or the addition of a peat mulch after planting. The addition of the peat is beneficial whether applied before or after planting. This is due to its ability to hold more moisture in the soil and it probably makes a more suitable medium for root development than is found in the sandy soil without the peat.

Planting systems have not been tested thoroughly, but it seems likely that single rows two and one-half feet apart, with plants a foot apart in the row, will give a good stand. A variation from this that may prove of value is to use "twin" rows a foot apart with a space of two and one-half feet between the pairs.

Lowbush plants under cultivation have shown a tendency to develop large clusters or "combs" of berries. In the wild, such clusters vary in the number of berries up to 12 or 15. Under cultivation, clusters are commonly found with 20 to 30 berries and sometimes large clusters of 40 to 60 berries have been found. The effect of this behavior on yield can easily be seen.

While it has not been proven conclusively that the cultivation of the "lowbush" blueberry is a commercial possibility, sufficiently encouraging results have been obtained to warrant continuing the work.

Highbush Blueberry Also Being Tried Out

During the course of these attempts to domesticate the wild "lowbush" blueberry, the possibilities of the vastly improved varieties of the eastern "highbush" species have not been overlooked. Through the courtesy of Dr. F. V. Coville a few highbush plants were obtained in 1916. In 1919 and subsequent years, through a cooperative agreement with the United States Department of Agriculture, Dr. Coville has sent about 1200 seedling plants which have been grown at Cloquet. Plants have also been obtained of some of the best improved varieties through the courtesy of S. B. Hutton, of Joseph White, Inc., Whitesbog, N. J. Wild plants and seed have also been obtained from New England points. These imported plants start off with vigorous growth and apparently are quite at home in Minnesota. Their appearance the next spring is quite different, however, as not one of the plants has proven sufficiently hardy to survive the dry, cold winters. The low shoots, which are covered by the early season snowfall, are able to push out into leaf and bloom, but the tops not covered by snow have invariably killed back. Low growing hybrid plants have shown less injury than the highbush plants of full size simply because the early snow more completely covers these low plants.

Such a highly valuable fruit plant as the improved "highbush" blueberry will not be abandoned without a battle. Through the science of fruit breeding, Minnesota already has produced hardy raspberries, plums, grapes and apples, and hardy pears, or even peaches seem to be in prospect within a few years. It seems entirely possible to put into the fruit breeding "melting pot" the hardy "lowbush" native type and the highly desirable eastern "highbush" type, and obtain, eventually, in the resulting progeny a "highbush" plant which will produce an abundant crop of good quality fruit and also have the hardiness of the "lowbush" parent. Towards this goal we are now working and hope for ultimate success.

Sundrying California Fruit

(*Continued from page 7.*)

The sun exposure, stacking and sweating processes are similar to those used for the apricot. The drying ratios vary with the different varieties, the Muir and Lovell drying about five to one (five pounds fresh fruit producing one pound dry fruit) and the Elberta drying about seven to one.

Pear Drying

The Bartlett is the most important pear grown in California. It is used for fresh consumption, for canning and drying.

Pears are picked when they are hard ripe. They are unfit for immediate use so are first put through a ripening period. The picked fruit is sorted for size and then allowed to remain in lug boxes until ripe or else are placed in bins where the fruit ripens. Some growers practice spreading the pears on a layer of straw and then covering the pears with a layer of straw. If pears are allowed to ripen on the tree, they become hard and gritty, hence the necessity of picking the fruit when green and allowing to ripen off the tree.

After the fruit ripens, it is cut lengthwise. The general practice is to remove the stem but leave the core untouched. However, some growers practice removing the core as well as the stem, thus producing a higher grade product.

In order to produce a high grade translucent product, it is necessary to sulphur pears longer than any of the other fruits. The time allowed for sulphuring varies from 20 to 48 hours and the sulphur used per green ton of fruit varies from 12 to 20 pounds. In view of the fact that long periods of time are required for sulphuring, it is necessary to re-charge the sulphur pit at intervals.

Owing to the fact that pears are easily discolored when exposed to the sun, it is the common practice to leave the trays exposed to the sun but a day or two, the remainder of the drying being done in the stack. Curing in the stack requires from one to four weeks, depending upon weather conditions. After drying, the fruit is placed in bins or in sweat boxes.

The above mentioned fruits are not the only ones used for drying purposes. Apples, figs and prunes are dried in large amounts, while some of the small fruits are dried in lesser amounts. Apples are usually dehydrated and not dried in the sun. Prunes are not sulphured but instead are dipped in a lye bath before drying.

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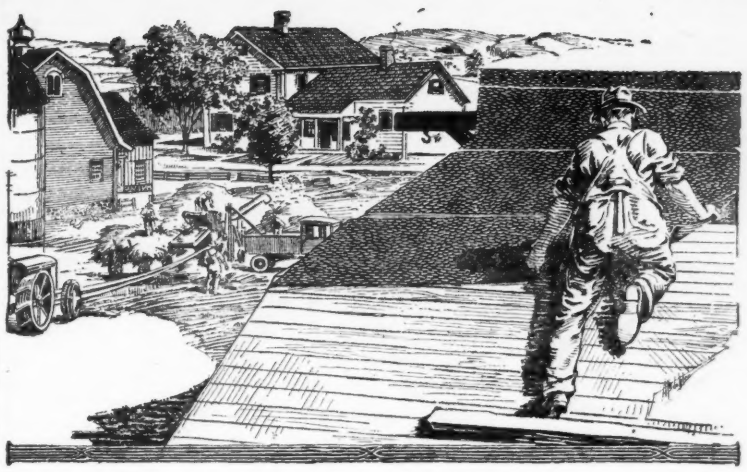

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Southern Peach Orchard Management

(*Continued from page* 5.)

periment Station, the terminal growth on bearing trees has averaged only about one-half as much on plats where vegetation has been allowed to grow in the rows as where thorough cultivation has been kept up from about the time of the shuck spray until the first of July. These same blocks have also produced one-third less marketable fruit.

Humus has proven one of the most important factors in the growing of a peach crop. Humus increases the water holding capacity of soil, and, hence, enables us to store more water in the soil. Soils which have been entirely depleted of humus, even with thorough cultivation, give only indifferent results. The humus content of the soil can be kept up by applying barnyard manure, but barnyard manure throughout the peach districts is very scarce and the haul is too long to permit of its being shipped in from stockyards. We are forced, therefore, to depend largely on the growing of cover crops among the trees.

The most satisfactory cover cropping program has been to plant cowpeas about four weeks before the peaches are harvested. The peas will make a rank growth by the middle of September, when they are turned under and a cover crop of rye planted to hold the land over winter. This rye cover crop also makes considerable growth the next spring, thereby furnishing additional humus. The cowpeas, in addition to furnishing humus, add considerable nitrogen to the land.

Red and crimson clovers are used to some extent, but occupy the land too long in the spring to be ideal cover crops.

Bur clover offers great promise in those districts where it does not winter kill. It matures seed early enough so that it will not delay regular cultivation, and reseeds itself annually. Where Bur clover is used, it is necessary to inoculate the soil with a nodule forming bacteria. This inoculum may be purchased, with directions for using, or the soil may be inoculated by scattering soil from a field upon which Bur clover has been grown. The Bur clover must be sown early in the fall for best results. Immersing the seed in boiling water hastens germination and often assures a good stand where it cannot be had otherwise. On the Station plats, we wash the burs in cold water, save the wash water and as soon as the seed is taken out of the boiling water, it is cooled and allowed to soak a few minutes in the first wash water. This reinoculates the burs so that no further attention need be given to inoculation. The burs are then scattered in rows by hand, and covered.

Fertilization

Neither satisfactory growth nor crop can be expected from a peach tree unless the soil is kept at least moderately fertile. Nitrogen is our first and greatest need, in fact, in many orchards, nitrogen is the only fertilizing element necessary. In many instances, however, we find the addition of phosphorus profitable, not so much from its direct effect upon the trees or the fruit, although we have considerable evidence in this direction, as from its effect upon the cover crops. A few orchards lack potash, although in the majority of cases no beneficial results have been obtained from applying potash. It must be kept in mind, however, that it is possible for any one of these elements to be a limiting factor in crop production, that is, where one element is lacking or deficient in the soil, even an over-abundance of the other elements will not make a crop. A soil may contain plenty of phosphorus and potash, but if it is short in nitrogen, the trees will make poor growth and little fruit. In such a case, the addition of nitrogen alone will counteract the trouble and it would be useless expenditure of time and money to apply any other fertilizer. This is the state of affairs that most often exists in our southern peach districts. Mixed fertilizer often give good results, and we find a great many of our growers using high-grade complete fertilizers. Such fertilizers give good results, not because all of the elements furnished are needed, but because the fertilizer contains the single element which is short. The fact that we apply more of a certain element than is necessary works no harm, but makes our fertilizer considerably more expensive than is necessary. The best way to determine what fertilizer element is necessary is to apply the different elements together, in pairs and separately, to different blocks in the orchard, and note results.

Nitrogen Gives Excellent Results

Throughout the peach growing districts in Arkansas, nitrogen, either in the form of nitrate of soda, or sulphate of ammonia, has given excellent results both in tree growth and in the setting of fruit buds. An average dosage of two pounds of nitrate of soda, or one-fourth less of sulphate of ammonia, per tree has proven the most satisfactory. The fertilizer should be scattered so that all of the space between the trees is covered. The best results are had not by scattering the fertilizer all at once, but by making two applications. Half the nitrogen should be applied two to three weeks before the trees bloom. This is especially true if there is a light bud, to increase the percentage of fruit which the trees set. The other half should be applied the last of May, or the first of June. This second application keeps the trees growing vigorously and produces a greater number of viable buds for the following year. Where the whole amount is applied early in the season, the trees often make such a rank growth of wood and foliage as to shade the fruit badly, and make it several days later in maturing. This is not nearly so noticeable when the dosage is split into two applications.

Another advantage of applying part of the nitrogen later, is that the trees will be kept growing throughout the summer and retain their foliage until frost. This prevents their going into the resting stage before cold weather and makes the buds much less susceptible to frost injury in the spring. Such a procedure would, of course, be undesirable in northern latitudes where the wood of the tree itself is subjected to winter injury during the severe winters. In this connection, again, I must stress the desirability of thorough cultivation, since, regardless of the amount of fertilizer used, growth will not continue throughout the summer if soil moisture is wanting. Blocks receiving thorough cultivation and nitrogen fertilization have averaged 3.70 bushels per tree, while those receiving thorough cultivation without nitrogen have averaged only 1.55 bushels per tree. Nitrogen fertilization on blocks where weeds and grass were allowed to grow, produced only 2.98 bushels per tree, while the checks, or blocks receiving no fertilization, produced, under the same conditions, only 0.33 bushel per tree.

Neither phosphorus nor potassium alone have given any results. Phosphorus, however, when used with nitrogen has increased the yield somewhat. For instance, as compared with 3.31 bushels for nitrogen alone, phosphorus and nitrogen produced 3.70 bushels on the well cultivated land. The best results from the application of phosphorus have been had from using about 400 pounds of acid phosphate per acre for two or three years, after which time phosphorus may be applied only every other year or even at longer intervals than this. While the tree itself utilizes less phosphorus than nitrogen, we find it profitable to use these amounts on account of the added growth which the cover crop makes. Phosphorus need not be applied early in the season, but may be put on the land at any time. Care should be taken, however, to make the application just before the land is cultivated,

in order to incorporate it into the soil. Unlike nitrogen, it does not go deeper into the soil, but stays largely where put at the time of application.

Loganberry Growing in the Northwest

(*Continued from page 4.*)

types which, if given good cultivation, hold moisture well.

Resume of Mr. Aspinwall's Methods

A resume of Mr. Aspinwall's methods is of interest. He states, "Cultivation should be started in the spring as soon as the land is dry enough to work well. It has been my practice to work the dirt away from the hills with the plow and grape hoe, then through the field about every 10 days until mid-July. This will insure a reasonable amount of moisture, even during a dry season.

"It is important that the land have good drainage. If the logans are set out on rolling land, they are by nature drained sufficiently to give good results, but some of the best berry land is quite flat, and often it is necessary to tile this before the best results can be hoped for. Tiling not only keeps the plants from drowning, but enables one to start cultivation two or three weeks earlier in the spring.

Land Needs Fertilizer

"Most lands will produce a good stand of canes for a few years without fertilizer, but if given clean tillage with no humus added, it will cause a rapid depletion of soil fertility. To overcome this, it is necessary to add some kind of fertilizer. Good barnyard manure is probably the best but it is seldom that enough of this is available except for very small fields. Sowing vetch between the rows for a cover crop is an economical method of fertilizing and gives very good results; this will loosen up the land and make it retentive of moisture, add humus and furnish a certain amount of nitrogen. In sowing vetch, a small disc drill is used, sowing about 45 pounds per acre. This should be sown the latter part of August or early September.

"I have also used nitrate of soda 300 pounds per acre and superphosphate 250 pounds per acre with very good results some years, but find it quite expensive and in very dry seasons, I could see no benefit whatever.

Training the Vines

"A good deal depends on the job of training done. There are nearly as many methods of training as there are growers, but it has been my experience that the fan style or single vine method will produce more berries on the same number of canes than any method I have tried. By spreading the vines out over as much surface as possible, all the laterals or fruit spurs have a chance to come out, giving the row a hedge-like appearance."

The largest volume berry grower in Oregon is Sam Brown of Marion county. In his yards, the loganberry holds a prominent position. His experiences have included all the ups and downs of the loganberry industry as he was one of the early growers. His first crop was from a 15-acre yard in 1908. "We had a small crop and were fortunate; the less tonnage we had the less money we lost," he said.

That was before the day of the enameled can—loganberries eat through tin. As Mr. Brown says, "They eat themselves out of tin as fast as put in." Drying and juicing were not developed then.

The year 1909 was a blank—for profits.

By 1910, the improved can was past the experimental stage and Mr. Brown sold his berries for two and one-half cents a pound, and made money. Labor was cheap. Even with the above acreage yield, it requires about five cents to pay expenses under present conditions.

"We have had good prices and at times prices that were too high," said Mr. Brown. "The extra high prices of 1920 had a very costly effect on markets by turning consumers away from logans.

"Growers co-operation in marketing will do more than any other one thing to prevent these sharp fluctuations," he continued.

Fertilization is given much attention in the Brown yards. Vetch is sown in the fall for a winter cover crop and is plowed under in the spring. At that time, the vetch plants are three feet or more in length. In addition, nitrate of soda and superphosphate are used.

Large Part of Oregon Crop Canned

Approximately two-thirds of Oregon's loganberry crop is canned. The fresh fruit is a summer staple on Northwest markets, but has not been developed as it deserves in distant consuming centers. Evaporated berries, if properly handled, are an attractive product, but are a product which has suffered from careless handling. Prune driers are often used for evaporating, the tunnel type being found preferable by most operators.

The new plantation gets a good start when the soil is put in best fertility and physical condition before the new plants are set. Two plowings—fall and spring—and numerous harrowings are steps that aid. In Oregon, new plants are set in March or April, nine feet apart in rows that are nine feet apart.

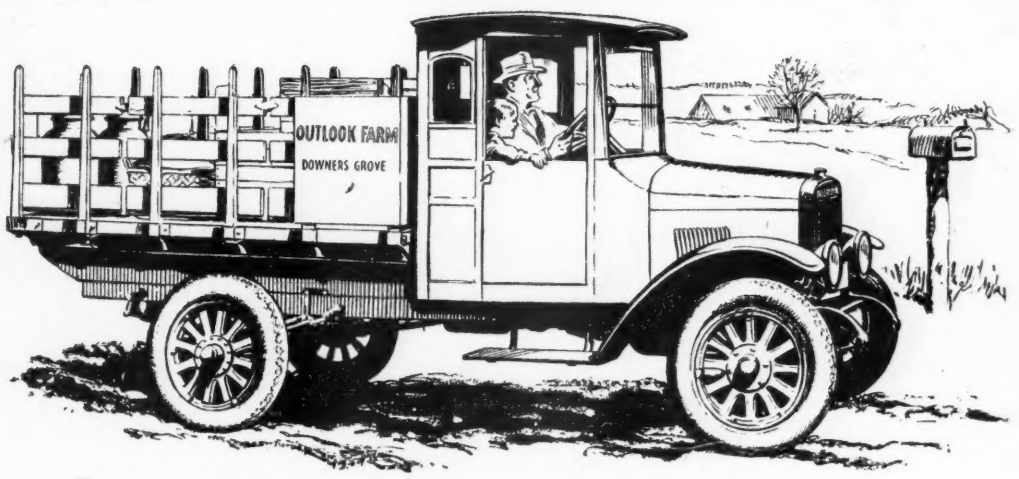
Loganberry Brought Out by Judge Logan

The loganberry was brought out by Judge J. H. Logan of Oakland, Calif., as a result of experiments in berry culture carried on in his home garden. Among many new blackberry plants, he found a single plant different in appearance from the various blackberry plants there. The new fruit was picked in 1883 and Judge Logan concludes that it is the result of a natural cross between a blackberry and the Red Antwerp raspberry, of which there was a full row in the garden.

At about this time Judge Logan brought out the Mammoth Blackberry as a result of an artificial cross between a wild blackberry and the Texas Early.

Judge Logan turned his loganberry over to the University of California for distribution and made no commercial gain from its discovery.

On the other hand, the United States Department of Agriculture, concludes that the loganberry is not a hybrid but a variety of the Pacific Coast trailing blackberry and is in fact a red fruited blackberry. The roots are perennial, the canes biennial, and take root at the tips like dewberries instead of suckering like red raspberries.



FARM HAULING *by* MOTOR TRUCK

FARMERS in every section are turning their hauling over to good motor trucks. There are plenty of practical reasons for the change.

The motor truck owner saves hundreds of hours per year and that means saving expensive labor for productive work at home. The automobile has shown him how to cut time and distance. Concrete and other hard roads are ready for his fast hauling. Distant markets are in easy reach. He is able to sell where prices favor him, and to buy likewise. In marketing his crops he cuts two days of old-style plodding down to a half day. Whatever he hauls—milk and cream, garden truck, live stock, fruit, grain and hay, sand and gravel, etc.—he does it *easier* and *cheaper* by motor truck.

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Pollination of Walnuts

Can you tell me what is the matter with my English walnut tree, the walnuts are all falling off even when there is no wind? The tree is now eight or nine years old, grafted on a black walnut tree. —C. O. C, California.

THE MOST common reason for walnuts not sticking to the tree is the lack of cross pollination. The best remedy is planting more trees of other varieties nearby so that cross pollination may occur. There are, of course, other troubles which sometimes cause walnuts to fall, but the chances are that it is a question of pollination rather than anything else. — *Paul Stark.*

Dynamite eradicates orchard soil diseases

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DU PONT DUMORITE

Status of Bud Selection in Improvement of Orchard Crops

by J. L. Collins
University of California

DURING the last decade the question of developing higher yielding strains of fruit trees through the isolation of bud sports of higher yielding potentialities has been subjected to considerable scientific investigation. Some important facts regarding efficient orchard production have become evident.

The whole theory of bud selection is founded upon the supposition that hereditary changes frequently occur "de novo" in some of the developing buds, which later become fruiting branches or trees. The practicability of bud selection would, therefore, depend upon two things—first, the nature (desirable or undesirable kinds) and second, the frequency of the bud sports.

That bud sports do occur is no longer a question for dispute. There are many recorded cases in apples, prunes, peaches, and other fruits. The origin of the nectarine as a sport from the peach was recognized by Darwin. All these are, however, but isolated cases among millions of buds that were not sports. What we desire to know is whether bud sports occur with sufficient frequency to constitute a basis for improvement by systematic selection and to require continual selection in established varieties to keep them up to standard, since undesirable types would appear as often as desirable ones.

In California, records have been made of the production of a large number of citrus fruit trees for a number of consecutive years. These records disclosed the fact that some trees gave relatively high yields year after year, while at the same time other trees in the same orchards gave low yields year after year. It was at first thought that the difference in yield of different trees was an expression of the genetic or hereditary differences of the respective trees, and that this difference had origin in bud sports in the buds on the tree or trees from which the buds were originally taken for propagation.

It was then strongly recommended, particularly by Shamel, that more care and attention be given to the selection of buds for the propagation of nursery trees; that they be taken only from those trees which had shown a record for high production over a series of years on the belief the ability for high production would be transmitted with the buds.

The trees, whose records showed were not producing a profitable crop, were topworked with buds from high-producing trees, and the statement made to the effect that such trees then became high-producing, profitable trees. However, no records were published to substantiate this claim, and later reports indicate that many such poor-bearing trees failed to improve in production after top-working with buds from high-producing parent trees.

At the Oregon Agricultural Experiment Station this question has been investigated. It was desired to learn if strawberry plants which gave a very low or a very high yield in a given year would transmit that peculiarity to their progeny grown from runners. Accordingly, runners were selected from a number of high-producing plants and another lot from low-producing mother plants, for if high producers can transmit this character, then it would be logical to expect the plants propagated from a low-producing mother plant to be low producers. In this regard, the results were disappointing, for there was no evidence after several years of such propagation that the mother plants differed genetically in regard to ability for production.

In Missouri, a similar question was investigated in a Ben Davis apple orchard. One tree selected for bud production was the highest producing tree in the orchard of 200, while the other was the lowest producing tree in the same orchard. The trees propagated from buds of the highest producing tree were placed in an orchard alternately with trees propagated from the low-producing parent tree.

The average yield over a six-year period of all the trees from the good parent was 7.2 bushels as compared with 8.5 bushels per tree, the average yield of the trees from the low-producing parent tree. There was no difference in the quality of fruit from the two lots of trees. The evidence thus produced shows conclusively that the difference in productivity of the two parent trees was not of a genetic nature and could not be transmitted through the buds to new trees.

We now appear to be in a sort of paradoxical situation. We find by orchard records that some trees (all propagated by budding) produce good profitable crops year after year, while other trees in the same orchard continue to give low, unprofitable crops year after year, yet in their hereditary potentialities they are equally good producers. We must then account for the observed constant difference in production in some other way.

Difference in Production Due to Two Causes

Sax and Gowen of the Maine Agricultural Experiment Station have done much toward clearing up this situation. After a statistical study of the data from several different types of crops, such as apples, citrus fruits, walnuts and potatoes, they concluded that much of the permanent difference in production of individual plants of a given variety could be ascribed to two general causes, variation in the soil and other environmental factors, and variation of a genetic nature among the root stocks on which buds had been placed.

In the case of perennial crops like deciduous or citrus fruits, variations in soil and in root stocks would continue to produce their effects on the plants throughout a period of years; hence, some trees favorably situated in regard to these two factors would produce good crops year after year, while trees from buds of the same source and kind but unfavorably situated in regard to either or both of these factors would consequently continue to give poor yields year after year.

If it were possible to dig up a bearing apple tree, without injury, and place a high-producing one in the hole where a low-producing tree of the same kind had been, and vice versa, it would be possible to determine the influence of soil and other environmental conditions in the yield of these trees. This cannot be done successfully with bearing trees, but in effect at least it is possible with potatoes.

In a field of potatoes of the same variety, some plants are heavy producers while others are very light producers, as has been noted in records of fruit trees. But here the same plant (tubers are underground shoots containing buds) does not remain in one place during a series of years, but is planted in a new location each year. Under such conditions tuber lines that are classed as high yielders one year are not consistently high yielders for a series of years. Likewise, the poor-producing plants of one year may be classed among the good producers the next year. There was no advantage gained by selecting seed potatoes from high-producing hills as contrasted with the results from using seed from low-producing hills from the same clone, when all were equally free from disease.

It appears from inference, therefore, that the difference of yield of individual fruit trees may properly be considered to be largely the result of constant environmental differences.

Unprofitable orchard trees are located by measuring the crop from each tree for three or four successive years. There is a method by which the grower can diagnose the cause of low production (and high production as well).

After the tree records have been obtained, a map of the orchard should be constructed showing the location of every tree marked in such a way as to indicate its average production. If the high-producing trees and the low-producing ones are distributed in a hit or miss fashion throughout the orchard, it is an indication that variation in production is due to hereditary differences in the stocks or buds used in propagating the trees. Removal is probably the best treatment for the unprofitable trees under such circumstances, and new trees planted in their stead, provided there is sufficient space to permit proper growth of young trees.

On the other hand, if the high-producing trees appear to be grouped together in certain sections of the orchard and the unprofitable trees grouped in other sections, it indicates variation in environmental conditions. In some cases it is possible to correct the unfavorable conditions, such as poor fertility, drainage, etc., and convert unproductive into productive trees. Replacing or top-working such trees alone would not remedy the evil.

A case of environmental conditions producing low yield is shown in certain trees of an orchard of 100 English walnuts. The 25 highest-producing trees were grouped in one corner of the orchard, while the 25 lowest-producing trees were grouped in a different section. This indicates a difference in soil conditions in the orchard.

Even orchards which are as a whole producing a good profit often contain many trees that are not producing an income, as will be noted from the records of orchard No. 1 below, which has been producing an annual profit of $500 per acre for a four-year period during which records were kept of individual tree production.

Percentage of—	Orchard No. 1.	Orchard No. 2.	Orchard No. 3.
Profitable trees.....	68	54	26
Self-supporting trees	19	32	42
Unprofitable trees...	13	14	32

This illustrates the type of information that can be obtained from individual tree production records. Orchard maps show the location of unprofitable trees and indicate the general cause of low-yielding trees.

Do you know how much sugar is required for different kinds of jellies? That's only one thing you can learn in the jelly bulletin published by the state college at Ithaca, N. Y. A new edition has just been issued. Ask for H 114 if you'd like a copy.

XUM

Preparing Fruit for Exhibition

By C. E. Durst

THE COUNTY and state fair season will soon be here and with it will come the question of making fruit exhibits. Many growers hesitate to make an exhibit because they feel they have no chance to win prizes in competition with the larger growers.

No grower should hesitate to make an exhibit for such reasons. Successful exhibition depends on a few fundamental principles rather than on the quantity of fruit grown. It is the judgment used in selecting the exhibit that counts. Prize-winning exhibits can usually be selected from crops of seemingly ordinary quality, if one knows how to do it.

Uniformity Most Important Factor

In planning an exhibit, one should bear in mind the points a judge will consider in judging the exhibit. Of all the points taken into account by the judge, uniformity is usually given the most weight. All score cards assign a large value to it. The fruit shou'd be as uniform as possible in all respects, including size, shape, color and degree of ripeness.

The larger fruits are quite often exhibited in plates of four or five specimens. Beginners are likely to pick out the best individual fruits and then place them together on a plate. This method will rarely bring home the prizes. Experienced exhibitors know that the individual fruits must not only be practically perfect, but that they must be as nearly like each other as possible. A wise judge will almost every time give the prize to a plate of highly uniform fruit of only fair quality, rather than to one which is sadly lacking in uniformity but in which the individual specimens may be perfect.

In exhibiting boxes or baskets, it is important that uniformity extend throughout the exhibit. Many a basket or box of fruit which has a beautiful appearance at the top loses the prize because of inferior specimens beneath. A good judge always goes to the bottom of the package.

How to Secure Uniformity

The best way to secure uniformity is to make the selection from the largest quantity of good fruit possible. A high-class specimen which is typical for the variety should be chosen. Usually, by holding this in one hand and by bringing other specimens up to it for comparison, an exhibit of great uniformity can be readily selected. If a sufficient number of fruits cannot be found to match the standard first chosen, it is best to select another standard. Never include in an exhibit an exceptionally handsome fruit which cannot be matched by others.

Other Important Factors

Specimens should be selected which are typical for the variety in color, size and shape. A Ben Davis apple, for instance, should not have too high color, and a York Imperial should have the truncate shape characteristic of this variety.

The quality and condition should be characteristic for the variety in the season the exhibit is made. A judge would not expect Winesaps, for instance, to be very ripe or have high color in August or September.

Exhibition fruit should by all means be free from blemishes caused by insects, diseases, bird pecks and bruises. The stems should be left intact. Some judges discriminate against polishing of the fruit.

Plate exhibits should be exposed with the stem ends all down, or all up, according to which makes the better appearance. The best appearing side of the exhibit should be placed so the judge will see it first, for, like other people, judges are likely to be influenced by first impressions.

Plates and packages should be as neat and clean as possible. If labels are used for naming varieties, they should be neat but inconspicuous.

In making group exhibits, the individual exhibits should be prepared in the manner described. Judges will give preference to group exhibits which conform closest to the description given on the entry list.

"A GOOD MANY cars have come into our part of the country during the past two years equipped with Fisk tires.

"Their owners tell me that they are getting unusual service from them; dealers say they are made by one of the largest and most reputable concerns in the business; from experience I know for our roads it is the best tire I have ever used."

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Time to Re-tire Get a Fisk

TRADE MARK REG. U. S. PAT. OFF.

Sugar Apples Proves a Natural Insect Trap

by Arthur A. Young

ANOTHER use has been discovered for sugar apple, that tasty fruit of the tropics. Children need no longer importune their parents to grow the sugar apple for its unsurpassed nectar, for it has recently been discovered as a first-class trap for the Mediterranean fruit fly. All farmers and fruit growers in the tropics will raise the fruit primarily for its insect-trapping quality.

Those of you who know anything of tropical fruits will know that the Mediterranean fruit fly is the most serious orchard pest. It is responsible for the loss of thousands of dollars of fruit crops every year. In spite of unceasing warfare, it has continued its work unabated.

The latest discovery is that the sugar apple is a natural trap for the insect. A Japanese fruit grower of Honolulu made this announcement at a conference of scientists getting ready for the Pan Pacific Union conference.

The fruit grower said that he planted a few star apple trees three years ago. They bore fruit this year for the first time. Over 1,000 of the purple-tinted fruit hung temptingly from each tree. Day after day children watched the fruit turn from green to purple. As soon as the entire skin assumed a purple hue, the fruit was ready for eating. As they ripened faster than they could be made use of, some over-ripe ones remained on the tree and diffused their tempting odor. Attracted by this sweet smelling odor, some fruit flies left their dirty, destructive work and investigated its source. It did not take them long to find out that the sugar apple was the cause of all this good news. They were glad. They flitted from fruit to fruit and selected the ripest of the ripest. They pierced the outer skin and began to drain the nectar. It must have been greatly satisfying, for the females not only decided that it was good drink but that the fruit itself would make a beautiful place for laying eggs. It was juicy, sweet-smelling, easy to puncture—what else could they wish?

But alas! Appearances are often deceptive. As everyone who has ever tasted the sugar apple knows, the fruit is covered with a thick skin permeated with a milky, sticky juice. If you were to bite through the skin, as in the case of an apple, you would find immediately after that your lips have a tendency to stick together. This is due to the milky, sticky juice. The best way to eat the sugar apple, therefore, is without the skin, removing the skin with a knife.

The insects, however, were unaware of this hidden quality. They punctured the skin and squeezed themselves in. When they got in they were held prisoners, for the sticky juice held them tight. It is estimated that thousands of females are killed in this manner every day.

As the tree comes to production in a comparatively short time, and as the fruit appears to be especially attractive to the insect, tropical agriculturists feel that the apple will prove a strong ally in the war against these insect pests, which have done untold damage to tropical growers within the last 15 years.

Ford Latest

A donkey in a field once looked over a hedge and saw a Ford standing by the roadside.

"Hallo!" quoth the donkey, regarding it curiously. "What are you?"

"I'm a motor-car," said the Ford.

"What did you say?" demanded the donkey incredulously.

"I said, I'm a motor-car," repeated the Ford.

"In that case," commented the donkey, "I'm a horse!"—*The Associated Grower.*

UNITED States Department of Agriculture Bulletin No. 1237, entitled "Organization and Development of a Co-operative Citrus-Fruit Marketing Agency," is just off the press. A. W. McKay and W. Mackenzie Stevens are the authors. A second bulletin by the same authors, No. 1261, bearing the title "Operating Methods and Expenses of Co-operative Fruit Marketing Agencies," will be ready for distribution in a few days. These bulletins describe in considerable detail the structure and operation of the California Fruit Growers' Exchange. Copies may be secured by addressing the Division of Agricultural Co-operation, Bureau of Agricultural Economics, Department of Agriculture, Washington, D. C.

XUM

Profits in Apple Growing

by J. D. Luckett
New York Agricultural Exp. Station

DOES it pay to grow apples? This is a question that fruit growers all through the east are asking today, and the answers reflect all degrees of uncertainty and confidence in the future of the industry. Twenty years ago the New York Experiment Station at Geneva set out to find the answer, and now the Station fruit men say that they are convinced that taking apple growing over a period of years there are good profits to be had, at least in western New York orchards where their observations have been made.

This is no theoretical answer based on a few trees grown under exceptional conditions, but is based on records of the actual income and outgo for each year of a 20-year period, in an honest-to-goodness apple orchard in western New York which is typical of hundreds of other orchards in that section.

A Baldwin Orchard

The orchard in which the Station figures were obtained is known as the Auchter orchard and is located just west of Rochester, N. Y. It was selected because it was as typical of the orchards in the great apple belt of western New York as could be found. The trees are Baldwins and were 27 years old when the work was begun and are now 47. The orchard occupies 10 acres.

The records show the number of barrels of graded and ungraded apples produced, the selling price and the cost of every orchard operation for each year of the 20 years from 1904 to 1923, inclusive. Included in the cost items are interest on investment, taxes, depreciation, tillage, pruning, spraying, superintendence, harvesting, barrels, packing, sorting and hauling to the shipping point one and one-half miles away. Knowing the total cost of each barrel of apples at the shipping point and the yield and selling price for each year, it is a simple matter to calculate the net return.

The Cost Figures

This Baldwin orchard during the 20 years of these records was probably in its prime, and average figures for the 20 years should give a fair idea of what is has cost to grow apples on these 10 acres. The following figures, then, show the average costs per barrel and per acre:

	Per barrel.	Per acre.
Interest on investment	$0.23	$ 27.50
Taxes	.018	2.25
Tillage	.09	10.90
Pruning	.06	7.30
Spraying	.125	14.86
Cover crop	.043	5.17
Superintending the orchard	.25	30.00
Harvesting (including barrels), packing, sorting and hauling	.853	56.97
Totals	$1.669	$154.95

The apples were sorted in the orchard into first and second grade and packed into barrels at once. The culls were disposed of as cider stock and drops and were usually handled in crates. The average yield for the 20 years of all fruit, either graded or ungraded, was 118.4 barrels per acre. Of this amount, about 87 barrels per acre annually were disposed of as graded fruit and what amounted to about 31 barrels as culls.

The Balance Sheet

The average annual selling price for graded apples in the Auchter orchard during the past 20 years has amounted to $3.22 per barrel, certainly a very conservative figure from which to estimate the profits in any first rate orchard. The culls have been disposed of at an average of 76 cents per barrel.

From these figures, the average yearly net profit on a barrel of apples, both graded and ungraded, for the 20-year period has been $1.51, and the average profit per acre, $120.71. With a valuation of $500 per acre on the orchard, the average annual net dividend, after deducting all costs, has been 26.3 per cent. Certainly this 10-acre tract has paid its way.

Commenting on the studies, Dr. U. P. Hedrick, Station Horticulturist, says: "These figures are reassuring to apple growers. Can they be duplicated by fruit growers? I think they can. The trees in the Auchter orchard were in the prime of life, with no young or decrepit orchard mates to bring down the average. Many orchardists could select a 10-acre block that has done as well or better. Fruit growers who have an aptitude at bargaining and in getting work out of men would have reduced the costs; shrewd salesmen would have added to the income."

Winter Injury to Peaches in 1923-24

(*Continued from page 5*)

gree of injury rather than in its kind, and possibly in the comparative influence of contributing factors. Thus, the reports following the winter of 1917-18 from Oregon, Illinois, Indiana, Ohio, New York and New Jersey, when weather conditions seem to have been essentially the same as those in southern Illinois in 1923-1924, all describe, with more or less completeness, certain of the symptoms observed this year. The contributing causes rather generally emphasized were lack of maturity, low vigor and advanced age, which seems to be its equivalent. In the present case, our observations led us to believe that partial maturity was to be given more weight than a low degree of vigor. Instances were not found in which old unpruned trees sustained trunk injury but were common in late cultivated trees.

Early Applications of Sodium Nitrate Beneficial

The history of previously reported cases of winter injured peach trees is a gradual recovery of all but the most severely injured. It has been found that early applications of sodium nitrate are beneficial.

While this report is based mainly on examinations made in Illinois, the same conditions have been found in Indiana, Kentucky and Georgia. Dr. Porter reports one case in Indiana where the paradichlorobenzene was removed from around the trees three weeks after treatment and severe injury to the trees resulted. This was probably due to the removal of the protecting blanket of soil. In another case, he found severe injury to every row of trees in an orchard where plowing had been done in such a manner as to throw the earth away from the trees. Where the earth had not been disturbed, but slight injury had occurred. In Indiana, as in Illinois, the one and two-year-old trees came through the winter in the best shape; some injury was found on young trees. Dr. Porter states that he has found injury on trees of all ages, two of the worst cases being on three-year-old trees in highly cultivated orchards, one of which was intercropped with sweet potatoes. Evidently the digging of the potatoes in the fall constituted an extra late cultivation.

The experience of the winter is a sharp reminder to the grower of the desirability of giving his orchard such treatment as will promote an early growth, retarded in time to induce maturity.

Making It Right

Lady (at fashionable ball)—"Do you know that ugly gentleman sitting opposite to us?"

Partner—"That is my brother, madam."

Lady (in confusion)—"Ah! I beg your pardon. I had not noticed the resemblance."—*Dundee Advertiser.*

Farm tenancy has been steadily increasing in the United States. In 1880, 25.6 per cent of the farms were operated by tenants; in 1890, 28.4 per cent; in 1900, 35.3 per cent; in 1910, 37 per cent, and in 1920, 38.1 per cent.

Spraying Before Rains

How long will spray material stay on foliage of a fruit tree? Is it proper to spray when it looks like rain or should it be a still, clear day? Is it all right to spray after five o'clock in the afternoon, daylight saving time?—G. E. D., Connecticut.

THE LENGTH of time spray material stays on the foliage depends upon many factors, chief among which is the weather. Another factor is the time of year, as this is related to the growth the tree is making. For instance, during the spring, when the leaves are rapidly enlarging, spray material will not cover the surface for any great length of time, in fact, even a day may make considerable difference, whereas in late summer there is less new growth and the leaves are not expanding, so the spray material may remain a longer time without losing its controlling power.

The ideal time to spray is before a rain rather than after. During wet weather fruit tree diseases are spread from leaf to leaf, leaf to fruit and tree to tree. As a rule, the spray will dry and stick to the foliage in an hour's time, or even less, so that spraying up to within a short time of a rain is effective.

There should be no objection whatever to spraying as late in the day as you can see to do the work thoroughly. The main thing is to get every leaf, twig and branch covered with the spray material, and it may actually be that there will be less burning at this time than near noon, when the sun is very hot. Of course, it is a very common practice to dust very late or very early in the day, or sometimes during the night. This is done in order to avoid wind. In regard to wind, even spraying is simplified somewhat by absence of wind. The mist-like material leaving the nozzles will settle gradually and reach all of the leaf surface evenly and not be blown against the outer surface only.

Orchard Soil Management

I have an orchard of 500 trees of McIntosh and Baldwin, four and six years old, planted on land which is rolling and of a slate loam. Would you advise cultivating the orchard or letting it go to sod? What can be done to an old orchard of Baldwin in order to obtain better colored fruit?—J. E. D., Massachusetts.

YOUNG fruit trees of all kinds should usually be cultivated while they are young, unless planted on soil which cannot be so treated. In this case, however, it is usually possible to cultivate narrow strips close to the tree, leaving the rest of the ground in sod. After trees reach bearing age, which is usually about five to six years after planting, orchards are often allowed to remain in sod with very good results. In this case, however, nitrogen is usually added in the form of a fertilizer, such as nitrate of soda or sulphate of ammonia, and applied to each tree early in the spring. As a matter of expense, the sod orchard is usually more economical, provided the necessary plant food is added. In addition to that, several other advantages are found with a sod orchard, particularly that of putting color on the fruit.

There are several factors which contribute toward putting color in fruit. The first, particularly in the case of old orchards, is that of proper pruning, so as to open up the tree and allow the sunlight to enter. Keeping a new orchard in sod will also accomplish much toward encouraging better color, provided not too much nitrate fertilizer is used, which will decrease production. Thinning is another operation which will not only increase the size but also the color of certain varieties which tend to hang in clusters, such as the Baldwin.

Best Cover Crop and Inter-Crop for Sandy Orchards

My orchard is located on light sandy soil with a fair amount of fertility. Can you suggest to me the best cover crop and the best inter-crop which I might use on this type of soil?—J. R. T., Michigan.

TWO VERY good crops adapted for sandy soils are beans and the combination of rye and vetch. Both of these are being used by a great number of Michigan orchardists with good success, and either would undoubtedly be adapted to your location.

If you desire to have a crop which will bring you in some return, the common white bean will make a very good crop with which to interplant your orchard. This crop demands the maximum of cultivation and will not shade the trees. Beans are also a legume crop which, owing to its habit of forming nodules on the roots, will leave some extra nitrogen in the soil after the tops are removed.

Perhaps the best cover crop for sandy soils is the combination of rye and vetch. This crop will usually make an excellent growth, which can be turned under the following spring, and adds greatly to the humus content and fertility of the soil. On sandy land, cultivation is very important in the early part of the season to conserve moisture, so that the cover crop should not be sown until mid-summer, when cultivation normally ceases.

Pruning for Fruit Production

During March of this year, I pruned only part of a prune orchard and since the fruit has set, I find there are no prunes on the greater part of the pruned portion while there are some where no pruning was done. Is this result common after pruning?—E. T. P., Oregon.

PRUNING is ordinarily practiced to encourage directly or indirectly the amount, size and quality of the fruit. It may, however, have the opposite result if not properly done.

The pruner must always know the fruit-bearing habit of the tree he is dealing with, and prune accordingly. In other words, if a particular kind of fruit bears its fruit buds on spurs, pruning must be so done as to preserve these fruit spurs and eliminate other portions of the tree in such a way as to enable these fruit spurs to produce their fruit and thereby serve their purpose in the best manner possible. On the other hand, another fruit may be borne on annual growth instead of spurs, and pruning of such fruit is naturally different from the other case. Many a man has pruned off hundreds of dollars worth of fruit by not taking into consideration the fruit-bearing habits of the trees. This is one of the chief reasons for the present-day recommendations in pruning which encourage as little actual cutting away of the trees as is possible to secure the results sought for.

"The Planting and Early Care of the Commercial Apple Orchard" is the title of a recent bulletin (E-75) by Joseph Oskamp, which has been issued by the New York State College of Agriculture, Ithaca, N. Y.

XUM

Summer Meeting of the Illinois State Horticultural Society

ON JULY 25 and 26, the Illinois State Horticultural Society held what is generally pronounced as the best summer meeting it has ever had. The meeting, which consisted chiefly of tours, took place in Union and Pulaski counties, which are among the leading fruit growing counties of extreme southern Illinois.

In spite of threatening weather, a large crowd of growers, county agents and experiment station representatives were on hand to start the tour, which began according to schedule. All told, about 90 automobiles and 300 people took part in the tour.

At the fruit farm of A. A. Appell, an excellent demonstration of soil terracing was seen. "Because of the rolling and hilly nature of the land in this section, it is highly essential, in my opinion, that the soil be terraced in order to preserve fertility and prevent erosion," said Mr. Appell. "The cost of terracing is very small and can be done very easily."

Because of the reported injury from paradichlorobenzene, marked interest was shown in the demonstration by Dr. W. A. Ruth and Dr. W. A. Flint on the Grover Rendleman farm near Alto Pass. The damage was shown to be a result of winter injury rather than due to P. D. B.

The Union county people are past masters in entertaining conventions and they proved themselves fully up to standard on this occasion. The ladies of Alto Pass served a cafeteria lunch at noon on the first day on a spot which presents one of the finest views in the state. Following lunch, an address of welcome was given by R. E. Blaylock, president of the Union County Farm Bureau. A response was given by J. B. Burrows, president of the State Horticultural Society. It is estimated that 350 people were present at this session.

Continuing the tour, visits were made to the orchards of O. H. Casper, L. T. Hardin, E. C. Boyd and G. P. Foehr. Talks were given on nut growing by O. H. Casper, Farm Adviser L. S. Foote and Judge W. O. Potter of Marion. The crowd was much interested in Mr. Hardin's account of how he produced such clean Transparent, Benoni and Duchess apples.

On the E. C. Boyd place, the peach fertilizer experiments being conducted by Prof. W. S. Brock were examined.

Leaving the autos at the main road, the visitors all felt much better acquainted with Union county after they had climbed the hills to the farm of G. P. Foehr, where a demonstration of the California Long System of pruning is being practiced with peaches. This method has fast been gaining favor in Illinois since Dr. Ruth first explained it at the winter convention at Urbana last December. Everyone was keenly interested in the detailed explanations given by Dr. Ruth, Dr. Flint and Prof. Brock.

Supper was served by the Baptist ladies at Anna, following which a round-table discussion was led by Prof. J. C. Blair, head of the Department of Horticulture. Many questions pertaining to the day's visits, as well as to other subjects, were discussed by prominent authorities.

Early Thursday morning, the crowd left over the new concrete road for Pulaski county. A brief stop was made at Balcom at the farm of Cyrus Plott, who explained his methods of cantaloupe production.

In Pulaski county visits were made to the farms of Harry Leidighs, Glen Aldrich, Dr. William Rife and R. S. Spaulding. About 25 growers and extension men joined the tour here from southeast Missouri. Discussions of peach thinning and strawberry growing took place on the farms of William Rife and Glen Aldrich. At the Spaulding peach orchard, W. S. Perrine, of Centralia, attracted close attention while he pruned a young peach tree as he thought it ought to be pruned in the summer.

The ladies of Villa Ridge served a most excellent lunch in the Grange community hall, following which an opportunity was given for all to become well acquainted with each other.

In the afternoon, stops were made at the farms of E. J. Koonce, R. B. Endicott and N. J. McBride. Dr. A. S. Colby, of the Department of Horticulture, led the discussion on the control of insects and diseases of raspberries. Bob Endicott waxed enthusiastic on chestnut breeding and production. Mr. McBride interested the visitors by showing them his dusting machine and explaining his dusting experiments. Ripe Mayflower peaches were donated by Mr. McBride.

The meeting was certainly a tribute to H. W. Day, new secretary of the State Horticultural Society, and to L. S. Foote and E. A. Bierbaum, farm advisers of Union and Pulaski counties, respectively. These young men apparently had the plans worked out thoroughly in advance and they seemed to have matters well in hand at all times.

Meaning of Metabolism

Editor, AMERICAN FRUIT GROWER MAGAZINE: What is the meaning of "Metabolism" as applied to tree growth?—L. C. D.

ANSWER: Metabolism in plant life comprises the sum of the processes, including chemical changes, which are going on in living cells, by which energy is provided for the vital needs of nutrition, assimilation, growth, fruition, etc. The processes incidental to these functions are grouped collectively under the name anabolism (from the Greek "anabole" or "something heaped up," or "collected," and hence "built up"), which is more consistently active in plant life than in animal tissues. Its opposite, or the giving off of waste, is known as katabolism, which, in consequence of their greater activity, is much more pronounced in animal cells than in plants. In katabolism, the processes are principally destructive, decomposing the protoplasm into simpler bodies and releasing elements not needed or harmful. The cells composing the green tissue of plants are highly anabolic, building up carbohydrates from the carbon dioxide of the air by photosynthesis, and utilizing these substances, with the nitrates and other mineral sata absorbed from the soil, in the formation of complex compounds, as well as in numerous secretions and by-products. This photosynthesis takes place in the chlorophyll-containing tissues of plants exposed to the action of light. The details of the process have not yet been clearly determined. The commonly accepted theory is that the carbon dioxide is reduced to carbon monoxide, which, uniting with the hydrogen of the water in the cell, produces formaldehyde and from this various sugars through polymerization (i. e., changing into another substance having the same elements in the same proportions but a higher molecular weight). The carbohydrates are apparently secretion products of the chloroplasts, derived from decomposition of previously formed proteids. The nutritive substances are usually quickly translocated, those that accumulate being changed to starch, which appears in the cells almost simultaneously with the sugars. The chloroplasts perform photosynthesis only in light and within a certain range of temperature, varying according to climate. In this way only is a plant able to organize carbohydrates. All plants without a chlorophyll apparatus, as the fungi, must be heterotrophic, or "deriving nourishment from without," and are known as parasites or saprophytes, the general distinction between which is that parasites draw their nourishment from living tissues and saprophytes from decaying matter, although some fungi can do either.

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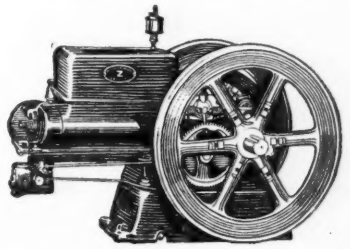

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A Problem of Management

Editor, AMERICAN FRUIT GROWER MAGAZINE: I would greatly appreciate your advice in regard to a problem before me.

A father owns a farm and pays the taxes. He and his son own the personal property jointly and each pays half the personal taxes. Both operate the place together. What is a fair division of the profits?—I. B. F., Washington.

ANSWER: You have given me a difficult problem, but I hope I can offer you a constructive suggestion.

First, I suggest that the parties decide on a fair rental for the property and that this amount be paid to the father.

Regarding the operation of the place, I suggest that this be planned on the basis of a partnership. The parties are already following this method so far as the chattels are concerned, since each owns half and pays half the taxes.

In case the father and son contribute about the same in the form of work and management, then, it seems to me, the problem can be solved fairly by dividing the net profits equally. If, however, one of them contributes more than the other, he should receive more of the income in proportion.—*Editor.*

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Edited by C. E. Bassett

EDWIN SMITH, executive secretary of the Pacific Northwest Fruit Commission, at Yakima, Wash., announced his resignation and reported that members of the commission had disbanded. This seems to be the end of another attempt to federate existing marketing machinery in the Pacific Northwest fruit districts. It seems to be about as difficult a job as that of uniting all of the churches into one big church. Each person approves of the plan, provided all the others are willing to come into his church or his fruit association. Everyone seems eager to do that kind of "co-operating," but it seems too much to ask anyone to give up his own affiliation. Then again, a good many fruit leaders, who now are drawing salaries from existing associations, hesitate about a new organization until their own future financial status is assured. The writer, 10 years ago, declared that the Northwest was suffering from a severe attack of "*co-operative spotitis*," or co-operation in spots. Instead of these local co-operative associations working together, they were strongly competitive and seemed to be trying to win the battle for the "survival of the fittest." A better feeling now exists, but it seems still too soon to expect a real union of all the Northwestern fruit forces to market their increasing crops of wonderful fruit in a sane and efficient manner. Harder times may bring them to their senses. The fruit districts of Washington and Oregon have some of the brightest fruit marketing men in the world and they have a most attractive product. But freight rates are and always must be high, so there must be no lost motion between scores of struggling local associations. Get together, boys, if you hope to succeed.

A GENERAL meeting of co-operatives' representatives is to take place in Cleveland, August 11 to 16, at which the entire co-operative field will be canvassed and their problems discussed. At the same time, a complete course of study will be planned for an international institute on co-operation to be held in the summer of 1925.

TWENTY-FIVE carloads of plums will be packed by the newly organized Rosecrest Fruit Exchange, which is affiliated with the California Fruit Exchange. The new organization is officered by E. J. Walton, president; Thomas J. Adams, vice-president; Nathan T. Bradford, secretary and treasurer. Other directors are Frank L. Kennedy and Guy Knupp. The organization is a non-stock concern, with membership fees of two dollars.

CHARLES Mansfield, of the White Salmon (Washington) Growers' Warehouse Co., has been appointed manager of the Star Fruit Co., a pool formed by Klickitat county growers two years ago. The Star Co. has taken over the business of the White Salmon Valley Fruit Growers' Union. A. R. Hayes is manager of the union. His term of office will expire in July.

THE WESTERN New York Fruit Growers' Co-operative Packing Ass'n held its fourth annual meeting recently, when developments for the last year were canvassed and the situation as it shapes up for the coming season was discussed.

A brief of the season just closed is given in the information that a total of 1463 cars of fruit were shipped. Altogether 163 markets scattered over 25 states, Canada and England were reached. Of this aggregate of sales, 91 per cent were sold f. o. b. shipping station, and this in a season when the volume of consignments in proportion to the amount of f. o. b. business was probably larger than ever before here, take one dealer with another. In 96 per cent of the sales, settlements were made on the basis of the invoice price, indicating the very small proportion of four per cent of adjustments.

All directors were re-elected. Present officers are, president, William J. Hall, Lockport; vice president, Fred Freestone, Interlaken; secretary, Charles S. Wilson, Hall; treasurer, William Carr, Albion. These, with M. C. Burritt, Hilton, make up the directorate. President Hall presided. The association has signed a three-year contract to sell through the Federated Fruit and Vegetable Growers. Nelson R. Peet is manager of the association, with offices located in Rochester.

TO ASSIST the strawberry growers of British Columbia in marketing the large crop of berries expected, the provincial government has advanced the sum of $100,000 to the Berry Growers' Ass'n, Ltd., Vancouver, B. C., according to a recent consular report. This $20,000,000 industry has been jeopardized by poor prices in recent years on account of a limited market and the shortness of the season, and it is hoped this loan will aid in relieving the situation. A stipulation is made that the fund shall be used solely for the expenses of marketing and preserving, the government to be secured by the entire season's output. It is expected that the surplus will reach between 500 and 1000 tons this season. Canneries are being established in central locations by the Berry Growers' Ass'n in order to handle the fruit to advantage.

REPRESENTATIVES of two fruit marketing associations which have heretofore supplied the same market and competed with each other, recently met and planned to work together and market their fruit in an orderly manner. One of the organizations is in Michigan, the Onekama Farm Bureau of Manistee County, and the other is in northern Wisconsin, the Bayfield Fruit Growers' Ass'n. Both associations produce red raspberries and both have sought to market their crops in Milwaukee, often with disastrous results. Plans were made at the meeting to sell the berries from both companies through one broker, who will inform the co-operatives of the market requirements of different sections and will control all shipments. Additional outlets will be sought and efforts will be made to distribute the fruit systematically and avoid glutting the markets.

A DEPARTMENT of news and information, in charge of a director of information, has been created within the National Council of Farmers' Co-operative Marketing Ass'ns, Chicago, Ill. The first service to be offered by the new department is a "news and information exchange," which is to be a kind of a relay station for publicity regarding the agricultural co-operative movement. It is planned to collect interesting information from the various associations, to digest, re-

(*Continued on page* 19)

Painting for the Orchardist

by Norman M. Collart

DO YOU look upon painting your buildings as a chore, as a necessary evil or as an opportunity? Show me your place and I'll spare you the embarrassment of the answer!

If you are the first chap, you probably painted your barns once upon a time, and the house, being very modest, doesn't need paint—at any rate painting isn't the most pressing thing that's bothering you.

But being citizen number two is quite a different matter. You may be unimaginative and you haven't time or the inclination to go in for anything fancy but you *do* believe in keeping the place well painted and protected against the weather, just the same as your tools are in the shed out of the wet. Nevertheless, while your place is above reproach, it is but one of the many, strung along the road with nothing that might cause the passerby to remember you.

Number three is the lad, however, who's getting the most out of his place—because he puts into it the most interest. To him, his painting is a chance to do and have something different, a method of putting the stamp of his own individuality on everything he uses and which will represent him in his community.

Painting is the only job about the place which the orchardist does not have to do by the calendar. The paint brush will turn spare moments to advantage from early spring into late fall. And rainy days and winter storms make the inside brighten-up jobs all the more welcome.

In the first place, don't think of paint entirely in terms of protection. We all paint for protection, of course —that's taken for granted—so let's think of painting for good looks, a bit. Here's where your opportunity is found. Green-eyed is the city chap whose flivver ambles past your front gate. He envies you your elbow room and the background of trees which make homes of houses. Good roads have brought you advantages. Have you built these advantages into your investment of home, buildings and equipment?

Many a job of painting goes undone simply because it looks like too many days away from important work, such as pruning, cultivating, spraying, etc. But prepared paint has changed all this. It is your minute man, your pinch hitter, and with a schedule of paint jobs listed according to their size and importance, you will be able to save many a half-day's time which would otherwise find a crew idle.

Painting Schedule Needed

Have a painting schedule. The most complicated set of buildings and equipment are easily kept painted if you have a set painting plan. Don't be dismayed if you don't know very much about paint. Simply don't make the mistake of thinking that "paint is Paint."

There is a paint, varnish or enamel for every finished surface about the place. One paint can't possibly do every painting job equally well. For example, there is the heavy duty house paint—the five-ton truck of the paint line—it is composed of nothing but pure lead-zinc and raw linseed oil with the proper drier. Like the truck —as compared with the pleasure car —this heavy-duty paint is too clumsy for general inside use. It does not dry quickly enough or with the right finish.

The reverse is true of the decorative enamels for furniture and the flat paints for walls. These finishes are refined to produce certain desired finish for the inside of the home and cannot possibly have the rugged oil content necessary to stand up under sun, rain, wind and storm.

Go to the most reliable dealer in your neighborhood and let him furnish you with the paint manufacturer's directions and recommendations. He will also help you plan your painting schedule and furnish color cards for the different paints for the house, the barn, wagons, trucks, implements, etc. You have a perfect right to expect something more of your dealer than a mere hander out of paint. If he is a live wire, he will have a painting service to give you that will clear up practically every knotty paint problem that will ever bother you. And what he can't answer, either of you can obtain directly from the manufacturer upon short order. Try it out! Don't guess; you can't afford to gamble away your peace of mind that way.

It pays to advertise. Be known in your community by the sleek appearance of your trucks, wagons and equipment. Have a special color combination everyone will learn to recognize as your own. If you have any difficulty in deciding upon a good snappy color scheme from the color card—and you couldn't be blamed, at that—write to the manufacturer. Tell him your story. He maintains a department for the service and convenience of folks just like yourself who think enough of their home and equipment to want the proper colors and the correct finish for each job.

This same scheme should, of course, be standard for the spray equipment, cultivators, etc., which have the habit of destroying a paint finish about as rapidly as any surface we know. Spraying materials, such as lime sulphur and Bordeaux mixture are so corrosive that all the machinery used in or about spraying will require regular refinishing. These surfaces should be washed with plenty of soap and water, using gasoline to cut the grease.

The spray tank should be finished in a good implement paint (your standard color) and the pump and tractor done in an engine enamel, using an oil-proof machine paint for those parts which are more or less greasy all the time (an ordinary paint is killed by engine oil). Most growers run oil through the pump along in August when spraying is over for the season. All movable parts are unscrewed and cleaned out to prevent the joints corroding and "freezing."

Don't let your packing shed be a place of punishment! It may not be finished off inside but a coat or two of mill or factory white will lessen eyestrain and incidentally ease off the light bill when rush season finds the crew burning "midnight oil." A dull-drying or semi-gloss paint is best for this purpose as a glossy paint causes reflections. The cattle barn and stables will be immensely more cheerful and small-hour chores less burdensome with white painted walls. Painting the lower part of the walls in a darker washable gloss paint will enable you to hose out these quarters with water.

Cement or concrete floors are proverbially dusty and will chip and rut up badly where there is much trucking or trundling of heavy loads over the surface. Like all forms of decay, cement breaks up first by dusting gradually which develops into chipping. This can all be prevented by using either a good concrete floor paint or a chemical concrete hardener. The floor should first be washed clean of grease and dirt before painting. A new cement floor must have time to cure and dry out thoroughly or the paint will be affected and probably peel off.

If you do very much preserving and canning you are, of course, convinced of the common-sense value of enamelled walls and floors which can be easily washed down. And if you pipe your syrup, vinegar and brine, this piping should, by all means, be painted in distinctive colors to quickly identify them in case of a leak or break. Here's a scheme many approve: Steam pipes, aluminum paint, hot water red, cold water blue, brine yellow, vinegar green, etc.

The Color Scheme

Now for a few ideas on color schemes: With your relatively clean

(*Concluded on page* 21.)

Beekeeping for the Beginner

by H. F. Wilson

IN MAKING a start with bees, it is customary to secure several colonies in the spring, and this gives the beginner a chance to learn something about the bees the first year besides getting a crop of honey. This is of course as it should be, but in modern beekeeping practice, the beekeeper's year begins in August rather than March or April. To have strong colonies in the spring, it is necessary to prepare these colonies properly the fall before. Weak colonies in the spring cannot possibly build up strong for the honey flow. With this in mind, one should, as soon as he has secured his bees, begin to plan for future honey crops.

It is best to divide the year into four parts. The *first* period extends from August until the time when the bees are put away for the winter. The *second* period extends from November or December until the bees can gather pollen and nectar in the spring. The *third* period is the spring period, and covers the time when pollen and nectar first appear until the time of the main honey flow, which in the clover regions is in June. The *fourth* period covers the time of the honey flow, and the results obtained during this time will tell the story as to whether or not the bees have been well cared for.

But before starting out on these various phases of the year, the beginner should be well informed on the kinds of bees and bee behavior, for these are important and no beekeeper can be thoroughly successful without a full understanding of the habits of bees. Anyone who is planning to make a start with bees should first secure a good book and read it through very carefully. At first there will be many things that are not clear, but after working with the bees a short time, most of the unfamiliar phrases and statements will be easily understood. It is very important that a knowledge of the development of bees be acquired as quickly as possible, for a number of important manipulations are based upon the time required for bees to pass through certain life periods.

Races of Bees

If one were to go out and examine the different flowers in the field, you would find many kinds of bees visiting the flowers. They range in size from the giant bumble bee to the very tiny bees which are several times smaller than the common honey bee.

For classification, all bees are divided into two general groups, according to the length of their tongues. In one group, we find bees with a very short tongue and these are known as the short tongued bees. The common honey bee is in this group. In the other group, we find the long tongued bees, which are the bumble bees.

Nature has so developed the flowers that some of them have a deep nectar cup, while in other flowers the nectar cup is shallow. Those with the deep nectar cup can only be fertilized by long tongued insects, while those with shallow nectar cups can be fertilized by the short tongued insects as well as by those having long tongues.

The honey bee, having a short tongue, is unable to secure nectar from certain plants having a deep nectar cup, and, as a result, seldom visits these plants. A common example is found in the clovers. Red or mammoth clover has a deep nectar cup and cannot be reached by the common honey bee, but they are found in abundance on the alsike, white and sweet clover. Occasionally, under certain circumstances, the flowers of the red clover become shortened, due to hot dry weather or lack of moisture, so that the common honey bee is able to secure nectar from them. One should not, however, ordinarily expect to secure a crop of honey from red clover.

All but a few of the short-tongued bees are solitary in habit, that is, they live by themselves and do not form in colonies. The females are fertilized in the fall and hibernate over winter as individuals. On the other hand, the honey bee must live in colonies in order to survive, and never hibernates. Even during the long winter months, they are clustered in the hive and keep warm by continually generating heat from their bodies. The mass of bees together are preserved by the heat energy produced, whereas a single bee would soon chill and die.

There are a total of six or seven species of bees that live in colonies and gather a surplus of honey to live on during the time when stores cannot be gathered from the field. All but one of these species are native to the Eastern Hemisphere. A single species has its original home on the American Continent, and this is a stingless species found in Central America. Unfortunately, this particular one gathers only small amounts of honey and is not suitable for commercial honey production. The common honey bee, so called because it is the one used for commercial honey production in all parts of the world, is scientifically known as *Apis mellifica*. Through centuries of breeding, several different races of this species have developed in as many different regions of the world. The more common of these are called German or black bees, Italian or yellow bees, Carniolan bees, Caucasian bees, Egyptian bees, Cyprian bees and others. The first two are the races now common in America. Both were originally brought from Europe.

The German black bee, which is a native of Germany, was imported to America by the first settlers and was the only bee in this country up to 1860, when the first Italian bees, which are native to Italy, were imported. The German bees are black in color, are more or less cross and difficult to work with because they run about on the combs and drop when disturbed. Because of her black color, the queen is hard to locate even by the experienced beekeeper.

The Italian bees are brown to yellow in color, are not ordinarily so cross as the German bees and do not run about or drop from the combs when disturbed. The queen is quite yellow and easy to distinguish among the other bees. The beginner should by all means have Italian bees to start with, as much of the pleasure of working with bees is soon lost if the bees are ugly and hard to manipulate. The complete development of the bee from egg to adult will be given next month.

Early Apples in New Jersey

COLD, wet weather delayed the ripening of early apples in New Jersey about one week this season, but the quality was pronounced excellent. The production was about 60 per cent of that of last year. Thus the yield decreased appreciably from the estimate of 85 per cent of last year's crop made in May by the Department of Agriculture.

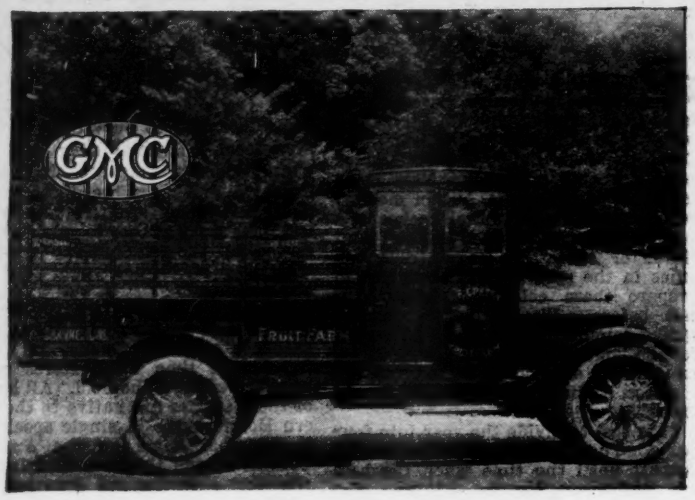
The Star apple, which is the first to ripen in New Jersey, has become quite popular as an early variety in that state. Besides its early ripening qualities, it has a little color and is said to bake without entirely losing its shape.

With the Co-Ops

(*Continued from page* 18.)

write and relay it to the publicity men in all parts of the country. It is believed that in this way material prepared for the members of one co-operative organization can be made suitable for publication in the house organs of other associations. It is the announced aim of the management of the service not only to furnish "reprintable" news stories about active associations, but to give also the story of the progress of the movement as a whole.

XUM



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Division of General Motors Corporation
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General Motors Trucks

ELEVEN hundred twenty-seven cars of fruit were packed last season by the Winter Haven Citrus Growers' Ass'n, Winter Haven, Fla., and sold through the Florida Citrus Exchange. This was 197 cars more than the previous season. The balance of the fruit was of low grade and was sold in various ways. Figured in boxes, the shipments for the year were as follows:

	Oranges.	Grapefruit.	Tangerines.	Total.
Packed	132,636	271,376	18,926	422,938
Loose	15,049	41,380	.....	56,429
Total	147,685	312,756	18,926	479,367

This association has been in operation for 14 years and available figures regarding its business for those years are shown below:

Season.	Field boxes received.	Fruit shipped. Boxes.	Approximate sums paid growers.
1909-10	.....	22,693	.....
1910-11	.....	23,263	.....
1911-12	.....	18,152	.....
1912-13	.....	119,788	.....
1913-14	.....	109,000	.....
1914-15	.....	162,276	.....
1915-16	.....	123,392	.....
1916-17	.....	140,938	$188,000
1917-18	.....	180,992	480,000
1918-19	.....	268,531	600,000
1919-20	479,498	452,205	990,000
1920-21	314,217	299,512	525,000
1921-22	381,582	374,226	655,000
1922-23	497,042	479,367	550,000

In September of 1921 an experimental coloring room was built and gave satisfactory results, consequently a six-room coloring house was erected in July, 1922, at a cost of $9000, including a gas house and automatic refrigerating plant. During the past season, a total of 70,040 boxes of fruit were colored at a charge to the growers of 10 cents a box for oranges and tangerines, and five cents for grapefruit. An analysis of the expenses showed the cost per box to be 5.008 cents, leaving a profit of $2,953 from the operations of the coloring plant. This has been returned to the growers.

Picking fruit cost the association $38,000 for the season, and expenses of hauling came to $37,000. The distribution of gain from operating expenses was as follows:

Building reserve	$18,500
Reserve for investments	2,043
Grapefruit rebate	8,141
Reserve for surplus	4,229
Rebate credited growers	4,798
Total	$37,711

Canning of grapefruit on a commercial scale was begun in the summer of 1922 when the Winter Haven Fruit Products Ass'n was formed by the citrus growers' associations at Winter Haven, Florence, Eagle Lake, Auburndale, Lake Alfred and Lucerne. In the summer of 1923, the canning company received 158,846 field boxes of fruit, which culled down to 136,066 boxes. The quantity of grapefruit used was 9,306,876 pounds, making 78,431 cases of finished product.

Water-glass for preserving eggs should be used in the proportion of one part water-glass to nine parts of water. The eggs should be clean, smooth and infertile; the container a clean earthenware crock.

A new book dealing with fruit and vegetable by-products has been written by Prof. W. V. Cruess of the University of California, who has been investigating this subject for the past 10 years. The book contains 515 pages and 100 illustrations and retails for $4.50.

Edited by C. E. Bassett

THE 18 associations now in the Michigan Fruit Growers are looking forward to a good year. They now have their own sales service, a sales manager who knows Michigan fruit and Michigan conditions through an experience of 10 years as one of the largest handlers of Michigan fruit. He has had co-operative experience in Michigan and other states. Regarding the problems ahead of the Michigan Fruit Growers, Mr. Granger, the new sales manager, said to the members:

"My experience has been that given efficient business management co-operative organizations ought to succeed in about the same proportion as private enterprises. Too often, however, co-operative enterprise is founded upon the sentiment broadcast by demagogic political organizers that competitive private dealer business is making too much money and that the middleman is robbing the producer, with the result that when the co-operative association is organized and begins to do business a competitive business battle then ensues which destroys the confidence of all interests and loses money for the man who is principally interested, the grower. It is interesting to compare this situation with the attitude adopted by the California Fruit Growers' Exchange as outlined by the general manager of that organization recently, in which he indicated that they had never felt that the middleman was a parasite to be destroyed but rather a means to the desired end of securing full value for their products. I hope that we in Michigan can follow their example.

"To my mind, the big benefit coming from co-operative organization is the opportunity to advance the standard of our fruit products through better grading, packing and advertising, etc., so that the whole level of prices may be increased.

"It seems to me that if all the interested factors in the fruit industry in Michigan, co-operative organizations, buyers, distributors and growers, can be brought together to understand the situation, that what hurts one hurts all, then we shall have no trouble in all co-operating to the end that everyone will be benefited. Instead of making competition among ourselves, we should get together to meet the competition forced upon us from other districts like New York, California and the Northwest and we shall have enough competition to keep us busy in that direction.

"Here's my idea of the requirements of the fruit business in Michigan if we are to put the industry on a solid foundation:

"First—every carload of fruit to be sold on an f. o. b. shipping point basis—not rolled unsold, consigned or sold delivered.

"Second—Every package of our best grades of fruit to be attractively labeled and marked so that the buyer can buy by trademark and be certain he is getting what he bargains for. If we are in the fruit business to make a success of it, we should take pride enough in our product to pack it attractively. Our competitors in California and the Northwest are labeling all their products and thereby creating consumer demand that we can't hold because we are shipping an unmarked and unnamed product."

EASTERN Jonathan apples will have less competition from the Pacific coast this year, according to the latest crop reports from the Wenatchee valley in Washington where the nation's largest Jonathan orchards are located.

It is estimated Wenatchee's crop will not exceed 1500 cars as compared with 3200 in 1923. The crop of Delicious also is short, the estimate for the Wenatchee valley showing 1000 cars in prospect as compared with 3000 cars last year.

The middle western and western states have considerably smaller apple crops in prospect for this season and this may tend to put markets in these states in a better condition to absorb the fruit. There will be little outlet for apples in the East. The New England states will have big crops.

Government estimates indicate the crop in Michigan is one per cent under a year ago; Illinois, 19 per cent below; Indiana, 13 per cent below; Missouri, 11 per cent below; Utah, five per cent below; Nevada, 15 per cent below; Idaho, 40 per cent below; Washington, 33 per cent below, and Oregon, 20 per cent below.

To offset these shrinkages, New Hampshire's prospects are 20 per cent above last year's crop; Massachusetts, seven per cent above; Vermont, two per cent above; New York, eight per cent above; Pennsylvania, five per cent above; Delaware, 25 per cent above; Maryland, 17 per cent above; Virginia, three per cent above, and West Virginia, 19 per cent above.

ELIMINATION of wasteful methods of marketing early apples and peaches, is one of the ends toward which the co-operative fruit growers of central and southern New Jersey are directing their efforts. As a part of this program, the Jersey Fruit Growers' Co-operative Ass'n has enlarged its packing house facilities and is employing additional experienced personnel to work with the growers for a finer quality of fruit. A packing house unit has been added for the accommodation of the peach-growing area around Hammonton.

An association inspector at the packing houses, in addition to the state inspector, has been arranged for by the growers. The association inspector will supervise the packing at all the packing houses throughout the New Jersey belt, in order that uniformity may be maintained regardless of the particular area from which the fruit may come. It is estimated that one-third of the early apples and more than one-fifth of the total peach crop of the state are now marketed by co-operative growers.

Efforts to shorten the time of delivery to consumers are being made by the New Jersey State Bureau of Markets and the New Jersey County Boards of Agriculture, and the Jersey Fruit Growers' Co-operative Ass'n is taking an active part in the correlation of the required data.

THE FLORIDA Citrus Exchange has launched a movement to ship part of its crop by boat to Atlantic and Gulf ports.

The idea, born years ago and abandoned because of the enormous cost in equipping boats to carry fruit and the slowness of water travel, has caught hold with the Exchange with what appears to be a decided definite tone. Boats to be used will not be owned by the Exchange. They are to be chartered, the line to be in effect a subsidiary of the organization. This plan obviates the necessity of a large investment in boats. Incidentally,

operation of the boats is deemed possible for the coming season.

L. C. Edwards, newly elected head of the Citrus Exchange, is advocating the ship-by-water plan. Mr. Edwards declares fruit may be hauled by refrigerated steamer from Tampa to New York for 32½ cents per box as against $1.25, the present rail charge.

Painting for the Orchardist

(*Continued from page* 19)

atmosphere, you may select any of the more delicate color combinations which might cause your cousin of the congested town street to hesitate because of friend neighbor's smokestack. But don't for this reason paint everything white just to escape the imagined ordeal of choosing a color scheme. And don't, on the other hand, go to the other extreme with heavy browns and funereal grays just because you feel that light colors are impractical.

Remember this, that any color scheme which depends upon its being just newly painted for looking passably decent is soon going to appear shabby as the new blush wears off. Where you have provided good color interest by combining two attractive colors the house will continue to look well because of this color interest, even though there will be a considerable deposit of grime on the surface. Have the fun and joy of a color scheme that welcomes your approach down the road.

Use the Best Paint

Buy the best paint the market provides. Not only will it go over more surface to the gallon, be more agreeable to put on, wear longer and be cheaper all around than any cheaper paint you might buy, but you will get more pleasing colors and colors that will *stay* pleasing. We have in mind several atrocious yellow houses which had that bilious look that made us step on the gas as we went down the pike. Then there are those unmitigated ponderous grays made by tinting white with a lot of lamp black without any umber or sienna to make them "human." A pure light chrome yellow will tint your white to a dainty canary yellow and an orange chrome will give that delightful Colonial yellow which is so friendly. Both colors need a trim color. Canary yellow is dainty with white while Colonial yellow works finely with white, ivory or a rich antique brown for trim. Both of these colors have the tendency of causing a house to appear larger, while the dark browns, grays and greens have the opposite effect and are useful in helping to make a large house less conspicuous.

A house situated in an open, exposed location will look less lonesome if it is done in cream gray or drab. But while you can overcome most of such shortcomings by selecting the painting colors carefully, you should lose no time in planting the necessary trees and shrubs to make the home seem a real part of the landscape.

Houses which are overtall can be made lower in appearance with an upper and lower body effect. But in this case the darker tone must be used above or a top-heavy look will result.

Do not overlook the importance of the roof color. A house needs an attractive roof just as a woman needs the right hat to complete her outfit. Black tar paint is excellent for composition roofs on outbuildings. It is durable and all that but you need color for the home. There is a wide range of suitable colors but too bright reds and garish greens should be avoided or toned down.

We have attempted to bring out some of the interesting points and bring home the opportunities there are for achieving something worth while in your home painting. There will be problems arising in many cases, however, which the editor invites you to refer in, personally. You are welcome to write in at any time and there is no obligation whatever involved.

The Peach

(*Continued from page* 3.)

glean from the soil plant food otherwise unavailable and turn it over to the trees. Why spend money on fertilizers when there are living plants to carry a contribution box to every nook and corner of the soil and to collect wealth from the nitrogen in the air and turn over the accumulated hoard to the trees? Food and drink, the primal necessities of plants, are supplied to most soils in abundance for trees. The thrifty man will make the most of them through the use of cover crops. The following is a good cover crop for peaches:

One bushel of oats, barley or rye, 12 pounds of red clover or 15 pounds of winter vetch, and one pound of cow-horn turnips. The three plants serve the general purposes of cover crops and each of them serves a specific purpose. The crops should be sown about the first of August and should be plowed under early in the spring.

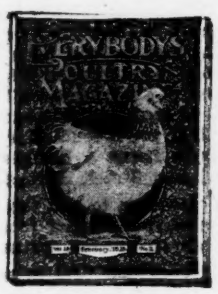
Thinning the Fruit

The best fruit, or even good fruit, can be grown only by thinning. Peaches are thinned to stand four or five inches apart and the work is done as soon as possible after the "June drop" is over. All peach growers mean to thin, but it is the operation in peach growing about which growers are most careless, both as to whether it be done and in the manner of doing it.

The varieties of peaches are many, not less than 1000 named kinds having been grown in the United States since the industry began. Of this number, not more than a score at most are worth planting in commercial orchards. Of these, the following, named in order of ripening, are most worthy of consideration: Greensboro, white-fleshed; Arp, yellow-fleshed; Carman, white-fleshed; Miss Lola, white-fleshed; Yellow St. John, yellow-fleshed; Waddell, white-fleshed; Pearson, white-fleshed; Champion, white-fleshed; Fitzgerald, yellow-fleshed; Niagara, yellow-fleshed; Belle of Georgia, white-fleshed; Crawford Early, yellow-fleshed; Edgemont, yellow-fleshed; Elberta, yellow-fleshed; Frances, yellow-fleshed; Crosby, yellow-fleshed; Crawford Late, yellow-fleshed; Kalamazoo, yellow-fleshed; Hill Chili, yellow-fleshed; Smock, yellow-fleshed and Salwey, yellow-fleshed.

A simple way to give apple sauce a new dress is too add several candy cinnamon balls such as the children buy. This not only adds a pleasing flavor but colors the sauce a fine pink.

America's most popular poultry publication. Beautifully printed on the best of paper with covers showing standard bred birds in natural colors. Edited by men who know chickens, and who are operators and owners of successful poultry farms. A magazine of from 64 to 136 pages—all solid, live, substantial information and advice.



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American Fruit Grower, 53 W. Jackson Blvd., Chicago, Ill.

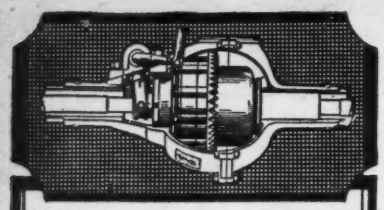
Result of Thinning Peaches

FROM an unthinned peach tree in an experimental block, 1870 fruits were harvested. Nature was allowed to "take her course," with the result that there were only 18 peaches out of 1870 which were over two and three-eighths inches in diameter. This unthinned tree had 217 peaches less than one and seven-eighths inches in diameter.

From a similar tree, 937 fruits were removed in thinning. At harvest this tree had only eight peaches of one and seven-eighths inches or less instead of 217. It had 181, instead of 18, in the two and three-eighths inch class, while the total number picked was 803 instead of 1870.

Nature had her way in the one case, and matured nearly 2000 worthless peaches on one tree. In the other case Nature was circumvented, and matured 803 peaches, most of which were fancy grade. Nature is intent on the preservation of the species. Quantity, not quality, is usually her motto. The standard she sets up is ability to survive.—*C. G. Woodbury, in California Fruit News.*

Subscribe to the AMERICAN FRUIT GROWER MAGAZINE—3 years for $1.00.



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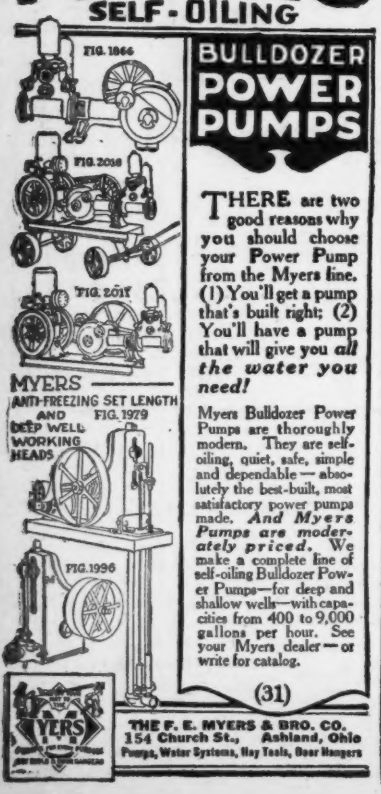

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154 Church St., Ashland, Ohio
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Development of Early Apple in Tennessee

(*Continued from page* 8.)

where competition is least and are taking full advantage of the early arrival of their fruit on the market. It is a general opinion among the growers that earliness is their natural and all important advantage. Certainly earliness unless it is accompanied with quality would not mean much, but the two combined result in good returns to the grower.

Transparents, Harvest and Duchess

These varieties come more nearly meeting the above conditions than do

A Good Ring-Face Pack of Tennessee Transparents

others. The Transparent, though a delicate tree and more or less susceptible to twig blight, is remarkably free from the fungous diseases. It always demands top prices on account of its quality and early arrival. The Early Harvest is our heaviest yielder in Tennessee. As a result of its vigorous growth and spreading branches, growers are frequently able to take from 20 to 30 bushels of graded fruit from a tree. The Harvest, although very susceptible to blotch and crown gall, is an excellent producer on account of its large bearing surface, which yields an abundance of large sized fruit. The Duchess or Oldenburg is more nearly an annual bearer than any of the above mentioned. It is very susceptible to blotch, and being a little later than the Harvest and Transparent, seldom brings as good a price. Other varieties, such as Red Astrachan and Fanny, have been planted to a lesser degree. These later varieties thrive well but some years they are rather difficult to sell on account of the time of maturity. They mature when the Harvests and Transparents from Illinois are supplying the market.

Where the Main Crop Is Produced

Surviving this rigid districting by man and by nature, and withstanding the reaction which resulted from serious mistakes early in the planting, there stands out pre-eminently a district known to Tennesseans as the "dimple of the universe." This area which produces a majority of Tennessee's crop centers about Maury county and includes Davidson, Williamson, Lawrence, Giles and Lincoln counties. In this district, the soil and climatic conditions are ideal for producing high quality fruit regularly and in abundance. It is this district that satisfies the northern and eastern cities' craving for green apple pie. The first early apples arriving on the central market are grown in this district. The industry is being operated on a conservative and economic basis and it has continually offered good profits to the grower. This section now produces around 100 cars of fruit, and this quantity comes from about 12 or 15 orchards. It would be well for my readers to distinguish between early apples and summer apples. The growing of early apples is very profitable in Tennessee but the growing of those that ripen after June 30 has not been found profitable. If we speak of Tennessee's apples in terms of the season, we shall have to call them spring apples rather than summer apples, for they are usually harvested before June 21, which is the beginning of summer.

Care of These Orchards

A majority of these orchards are owned and operated by farmers who were born and reared in this district. This accounts for the unusual conservatism which has prevailed. These counties are scarcely known to Tennesseans as an apple producing district, since they go about their work industriously, but make little noise about their accomplishments. Their quiet way of going about their work has not done much to increase planting, but it has kept the industry free from booms and reactions. Practically all of the growers practice clean cultivation. They believe in fertilizing regularly, and they never fail to spray their orchards thoroughly each season.

Diseases and Their Control

On account of the warm, humid climate and abundant rainfall, the growers are constantly at battle with fungous diseases. The disease of greatest economic importance to the early apple grower is blotch, and since the growers have learned the use of a properly timed Bordeaux mixture, they have been successful in controlling this malady. The crop just harvested was a fine example of what can be accomplished in the way of disease control by orchard sanitation, and thorough and timely sprays. Where the recommended spray schedule was carried out, blotch was held to a minimum, causing less than one-half of one per cent damage. If these excellent results continue, it will stimulate planting, for blotch has taken a heavy toll annually.

These growers, though conservative, are very enterprising. They recently organized the Middle Tennessee Early Apple Growers' Ass'n. At the beginning, this organization controlled 80 per cent of the state's production. The selling of the crop was placed entirely in the hands of the association. The grading was done with modern machinery and the crop was packed in bushel baskets, ring-faced, labeled and shipped. The grading was done according to United States standards, which resulted in the entire crop bringing a good price.

Treatment for Poison Ivy

THIS is the time of year when people suffer from poison ivy. If you are planning a vacation, or are going on a trip, and fear poison ivy, there are a couple of precautions you can take that may relieve you a lot of pain and worry.

According to a recent book by James B. McNair, of the University of Chicago, it is a complete preventive to wash the exposed surface of the body with a solution of five per cent iron chloride in 50 per cent alcohol and water. This treatment will render harmless any poison it touches, will prevent injury from the poison before it enters the skin, and will stop the spread of poison.

It should be kept in mind that the above treatment is simply a preventive and not a cure for poison which has already taken effect. Its application will not heal ivy-blistered skin.

The injury caused by ivy poisoning is similar to a burn and will heal slowly. Paraffine was found during the war to be one of the best remedies for burn and this is one of the best substances to apply for healing ivy burn. People who are going on vacations or trips where they are likely to meet poison ivy should take with them some chloride mixture and a few paraffine candles.

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Mr. Bradfrod Is Right!

But the best advertisements of *this* tobacco are never written

From Indianapolis, Mr. R. O. Bradford bursts into song:

The Pipe of Inspiration

I can see him now a-sitting at the desk he loved so well,
Late at night, and still hard at it, writing copy good to sell.
And he smoked his pipe in silence, while his thoughts to business ran,
Guess he's writing still, for father was an advertising man.

First he'd scatter all his papers, till his desk top was a sight;
Then he'd turn from his typewriter and gaze out into the night.
But when once his thoughts had started, and the work for sure began,
Dad would clean his pipe, and fill it from the little old blue can.

Edgeworth! Bless your soul, you've guessed it! Dad was surely sold for fair,
On that ready-rubbed tobacco, and he never seemed to care
Just how long and hard his hours, or how high the work was piled.
All he wanted was the blue can, and he smoked his pipe—and smiled.

Pipe of inspiration. Righto! I'm an advertising man myself, and I've learned to realize and appreciate just how much Edgeworth means to me when there's a tough problem on deck, or when work piles up and requires long hours to clear it away.

Pass the good word along. It's Edgeworth that is responsible for lots of good advertising copy nowadays.

Ralph Otis Bradford.

Mr. Bradford is quite right when he writes that "Edgeworth is responsible for lots of good advertising copy" for, as every writer knows, there *is* inspiration in a good smoke, but the words that fill this column do not sell Edgeworth. As a matter of fact, they *aren't* copy at all—they are just gossip about pipe smokers.

The advertising that creates Edgeworth smokers is broadcast from Jones to Smith to Robinson *by word of mouth.*

The best we can hope to do in this space is to get another Mr. Jones started.

Even if your name *isn't* Jones we'll be glad to send you free samples of Edgeworth if you'll send your name and address to Larus & Brother Company, 83 South 21st Street, Richmond, Va.

If you care to add the name and address of your regular tobacco dealer we will appreciate the courtesy.

Edgeworth is sold in various sizes to suit the needs and means of all purchasers. Both Edgeworth Plug Slice and Ready Rubbed are packed in small, pocket-size packages, in handsome humidors holding a pound, and also in several handy in-between sizes.

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Co-operation Essential in Equipping Home

by E. W. Lehmann

MUCH has been said and written during the last few years about co-operation and co-operative schemes for the fruit grower, the dairy man and the general farmer as a means for reducing his costs and making his business pay. So much has been said about the marketing of the fruits and schemes for handling the business of the farm that the most important part of the farm, the home, has been practically ignored, and the most important co-operative relationship, that between the men folks and women folks, has been overlooked to a more or less extent.

In no other occupation are the women so close to the men's work as in the business of farming. In fact, the women play a most important part in the operation of the farm, and the productive work of the women on many farms makes possible success where otherwise farming would be a failure. When conditions arise that result in a partial failure of the fruit crop, or if the other crops are poor, the farmer realizes the importance of the woman's work on the farm.

On many farms the canned fruits, vegetables and meats, and the funds available from the sale of poultry and eggs, are the only thing that keep the farming business from bankruptcy. Farming is truly a business in which the women are active partners of the men, although they may not be recognized as such. The men might well spend some time in thinking over the home problems and of the part the women play in making the farm succeed. Mutual helpfulness and a willingness to study and take an interest in each other's problems is bound to lead to a fuller measure of happiness. Misunderstandings and unhappiness are most often due to a lack of interest and appreciation of each other's needs and problems. A friendly interest and a proper understanding is worth much in the business of making a successful home.

In this connection, Mrs. Hal B. Fullerton has raised the following questions that might well be pondered over and taken to heart. She asks:

"How many of us women are truly interested in the workings of our menfolk's business? How many of us care whether the barn roof leaks, whether there is water handy for the stock, whether the crops are in fine condition, whether the rotation of crops is proving successful? Are we pleased when the cow has a calf? Are we sorry when the horse is sick? Are we "tickled pink" when the farm acquires a new cultivator, or sprayer, or a tractor? I do not mean, are we financially interested or pridefully interested; are we interested with our hearts?

"And you men; do you care whether the kitchen stove is good and the chimney draws? Do you care whether the women folks have running water and whether the kitchen sink is high enough so the women are not breaking their backs washing dishes three times a day? Do you care whether you moisten the dirt on your hands until it is nice and soft and then wipe it on the towel for the women to wash out; or do you rinse the dirt off the hands, and use the towel for drying them? Are you "tickled pink" when she gets a fireless cooker or sweeper or washing machine?"

After living on a farm, and after spending some time in studying farm life and farm living conditions, it is the opinion of the writer that the women in general have thought more about the men's problems and their needs out in the orchards and fields than the men have thought of the needs in the home.

We should remember that "to cooperate means to so conduct ourselves so that other people can work with us." The work may be planning the family budget, arranging the laundry equipment, or getting out the week's washing. It may be a study of the equipment needs of the home, or a study of the equipment needs of the farm. Selfish demands, without careful thought, on either side will often lead to inadequate and uneconomical purchases and dissatisfaction and unhappiness.

Closets and Cupboards

PLENTY of closet and cupboard room is a sign of a well-planned house. Every woman who shows her friends through her home points with pride to the closet space. A closet near the front door for wraps and umbrellas is most desirable and almost a necessity, say those who are studying the problem of household arrangement. Wraps are easily taken care of as soon as a person enters the house and are easily obtained when leaving.

In the farm house, it is desirable to have a clothes closet at the back of the house so that those having to do outside work may have a convenient place to hang coats and leave boots and heavy shoes. In many cases, this closet may be combined with a wash room and located adjacent to the kitchen, where it will be warm and comfortable.

Every bedroom should have a closet. Many of the older built houses had few closets, and for this reason more furniture was needed for storage of clothes. The closets should be equipped with hangers. It is possible to take care of a number of suits and coats if the hangers are supported on a pole or rod placed across the closet. A linen closet located conveniently to the bath room is needed in every home.

Plenty of cupboard space for storage of pots and pans in the kitchen, and space for dishes either in the pantry or kitchen should not be overlooked. A cleaning closet for the brushes and brooms and the dust cloths and the dust pan puts this equipment where anyone can find it without looking all over the house.

Open cupboards in the kitchen are often desirable for the utensils that are used every day. Much time can be saved by having the equipment where it can be easily seen and reached.

In planning a new house, or in remodeling an old one, careful attention should be given to the number, size and location of the closets and the cupboards.

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CHATS WITH FRUIT GROWER'S WIFE

By HAZEL BURSELL

Planning Picnic Lunches

DO YOU work so hard getting ready for a picnic (mainly in preparing the "eats") that your day's outing is completely spoiled? Most farm housewives think they cannot go on a picnic without taking along a dish of everything edible on the farm.

The first thing on the program is to sit right down and plan the picnic meal. You should have a reasonable variety—include some foods for their filling quality, some for crispness, some for sour or piquant flavor, some sweets, one meat, cheese or egg dish, and something to drink—but not more than one dish of the same type. Plan for sufficient of each thing so that every member of the party can have his or her fill. Preparing several kinds of cakes, pies, cookies, two meats, a salad, baked beans, and dozens of sandwiches, all for one meal is unnecessary for the enjoyment of the lunch, and entails too much useless work for the busy housewife.

A meat, a salad or vegetable dish, buns or simple sandwiches with filling other than meat, pickles or radishes, coffee, and a simple dessert of watermelon, or cookies, or cake and ice cream, or cantaloupes and ice cream will form an elaborate picnic lunch.

Supper in the Woods

Suppers prepared in the woods are delicious and "heaps" of fun. Try taking along buns or bread and butter for sandwiches, beefsteaks to fry or roast on forked sticks over the coals, potatoes and onions to roast in the ashes, a head of cabbage and the seasonings for cold slaw, the makings for coffee, and cookies or cake! See if this supper isn't voted the best yet! The work will be shared by all members of the family and Mother will have pep and energy to share in the fun.

Another good prepared-on-the-spot supper consists of bacon and eggs fried in a skillet, coffee, roasted "spuds," pickles, buns and butter, plus a simple dessert. A salad may be substituted for the potatoes and pickles. If no other salad is used in the menu, a fruit salad prepared at supper time makes a popular dessert, when served with bread and butter. Marshmallows toasted over the embers will top off any meal.

If you have or can procure a wire toaster, with a long handle, you can make tasty toasted sandwiches, with a variety of fillings, and serve them piping hot. Slice the bread thin, spread evenly with butter, add a layer of cottage cheese, pimento cheese or ordinary American cheese, or spread with a paste of raisins, dates and nuts, or peanut butter to which has been added chopped pickle and chopped hard cooked egg, add a second slice of bread and toast till nicely browned. The bread may be toasted and put together with fillings afterwards, if the fillings (such as tomatoes, lettuce, meats, etc.) will not stand toasting.

Sandwich Menu

For menus with sandwiches as the main food, a salad or vegetable or baked beans, coffee and a dessert are the only essentials. Pie would be a suitable dessert with a sandwich meal.

A few suggestions for simple picnic meals have been given, and these should suggest countless other combinations to the housewife. Select menus involving as little preparation as possible and those in which all members of the family may share. Have a few things at one time, have them nourishing and appetizing, and have plenty of food as the outdoor air brings tremendous appetites. These are the cardinal points in preparing picnic lunches.

Every mother should encourage her children to help. Even the very small tots can be of real assistance in running errands or wrapping sandwiches. Make a game of it. Do not say, "Now, Mary, I want you to stay in and help me." Rather say, "Children, we are all going on a nice picnic tomorrow, and if you're good I may let you help me fix the lunch. Would you like to do that? We'll have lots of fun getting ready." You'll be more than gratified by their enthusiastic efforts to help. If they are older, they will possibly want to do all the work of preparing the lunch. You can make them *want* to do that, too, by using tact.

Keep Camp Utensils

You should have a basket, hamper or food box in which the essential camp utensils may be kept from time to time. This will save the time and energy of sorting them out each trip. The box should contain a set of steel knives and forks, teaspoons, aluminum salt and pepper shakers, can-opener, long handled skillet, a camp coffee pot or several tin buckets with close-fitting lids, and tin or granite plates and cups if you have them. It is often more satisfactory to keep paper plates and napkins on hand for picnics. A water bucket will be needed also. A square box with shelves for carrying pie or cakes will meet with mother's unqualified approval, and may be made by one of the boys. Do not forget a butcher knife, tablespoons and a long handled fork.

Do not cumber yourselves with useless equipment, but take what is needed for comfort and convenience. Wrap and pack the food in such a manner that it will not spill or be crushed. Liquids carry well in screw-top fruit jars. All sandwiches should be packed in air-tight boxes or wrapped in groups of four or five in wax paper so they will be just as fresh when eaten as when made.

Let's have more fun and less work at our picnics!

Body Tissues Need Minerals

THE HOUSEWIFE may observe all the usual rules for the planning of meals for the family and still not have well-balanced daily rations—the necessary minerals may not be supplied unless special effort is made to see that foods rich in minerals are included. Minerals are needed to build the bony tissues of the body, and to some extent all tissues, and to regulate body processes. Poor teeth, lack of color, which often shows anaemic or lack of red corpuscles in the blood, constipation, pimples and general absence of bodily tone, are commonly the result of a diet lacking in minerals.

Three minerals are essential: Iron, Phosphorus, and Calcium or lime. The bones of the body are largely made of calcium or lime; the red color of the blood as well as its power to carry oxygen to the cells is due to iron; the body cells could not produce new cells or develop the old ones without these minerals; we could not convert foods into tissue or heat and energy without the phosphorus found in each cell. In fact, every body process is dependent in some manner on this type of food material.

Therefore, it might be worth while to study the following chart to ascertain which of the common foods are rich in each of these three important minerals—iron, phosphorus and calcium. Those placed first in the table are usually the best mineral sources:

Iron	
Lima beans (dried)	String beans
Navy beans	Potatoes
Peas (dried)	Cabbage
Whole wheat flour	Sweet corn
Spinach	Dandelion greens
Lean beef	Almonds
Egg yolk	Molasses
Oatmeal	Lentils
Rolled oats	Beets
Raisins	Dates
Prunes	Dried figs
Phosphorus	
Peas (dried)	Fish
Navy beans	Peanuts
Egg yolk	Almonds
Lean beef	Cornmeal
Milk	Walnuts
Cheese	Potatoes
Whole wheat flour	Turnips
Buckwheat flour	Barley
Oatmeal	Dried sweet corn
Rolled oats	Carrots
Lentils	
Calcium	
Milk	Celery
Eggs	Cheese
Beans	Cottage cheese
Almonds	Dried figs
Parsnips	Molasses
Turnips	Spinach
Cauliflower	Peanuts
Carrots	Lettuce
Oranges	Lean beef

It will readily be seen from these tables that the more concentrated or dried fruits and the green vegetables are the classes richest in minerals. Almonds, lean beef, cheese and beans will be seen to be high in all three. Eggs are high in iron and phosphorus; milk high in calcium and phosphorus, rolled oats in phosphorus and iron, molasses high in calcium and iron, peanuts and peas in phosphorus and iron, and potatoes quite good in iron, but not so high in phosphorus.

The housewife, knowing the fruits, vegetables and cereals rich in the three important minerals, should have no difficulty in remedying any defects due to lack of minerals in the diet..

Straw Hat Renovation

RENOVATING a straw hat does not require the skill of an expert milliner or cleaner. All that it requires is patience and a small amount of knowledge concerning the principles of renovation.

The first thing to be done is to remove the lining, facings, trimmings and threads which may be on the hat. If there are any holes, mend them carefully with straw. Take the headsize measure inside the crown and be sure the hat retains the same size after cleaning.

Soap Suds and Water Do It

Use ivory soap suds and very little water and scrub the hat thoroughly with a small brush. Wash first the crown and then the brim. This removes the dirt and the old polish. In a hemp hat stuff the crown with paper to keep it from going up. Take a cloth and lightly wipe off the soap. Then let the hat dry thoroughly before dyeing.

In pressing have a rather hot iron and put a cloth over the hat. If the crown is to be raised, cut from the brim and insert a strip of buckram.

In dyeing a black hat, use dye which is "runny" and not "clotty." Start at the top of the hat and paint down, always going one way and painting as large a surface at one time as possible. Let the hat dry and then apply natural-colored shellac to protect the color.

Bleach White Straws

For the natural and white straws a bleach of roll sulphur and water is used to whiten them. A thin paste made of five cents' worth of sulphur and a small bottle of peroxide of hydrogen will serve the purpose well. Take care not to use too much sulphur in the paste. Apply this bleach after the hat has been scrubbed with suds and water and is thoroughly dried. It may be necessary to use several coats of the bleach if the hat has been badly sunburned.

Keep the hat from the sun and stuff the crown full of paper while it is drying. When dried remove the paper and take the hat outside for a thorough brushing to remove the sulphur paste. Lemon juice and sulphur may also be used for the bleach. But this paste is not quite as efficient as the peroxide sulphur mixture. Benzine is sometimes used in cleaning white hats. Shellac is never used on white hats.

By observing these simple directions it should be a simple matter for the housewife to "perform on" either father's or her own straw hat and make it look like new.

Table of Equivalents

"A PINT'S a pound, the world around," is probably one of the most erroneous statements that circulate in the world of cookery. It is true in a limited number of cases, but in more is very far from the truth.

Fats, most liquids and granulated sugar will run true to tradition, but woe to the cook who measures flour, meal and coffee by the pint in the belief that she is using a pound.

Some of our older recipes are given to us in terms of pounds and ounces. This is especially true of holiday fruit cakes and plum puddings. For this reason it is well to have posted in a convenient place above the work table, the following table which will give some of the more common foodstuffs in terms of both weight and measure. The following table will serve as a beginning and to it each housewife may add other items as she desires:

2 cups butter, solid	1 pound
4 cups bread or pastry flour	1 pound
2 cups granulated sugar	1 pound
2⅔ cups powdered sugar	1 pound
2⅔ cups brown sugar	1 pound
4¾ cups rolled oats	1 pound
2 cups finely chopped meat	1 pound
9 large eggs	1 pound
12 tablespoons liquid	1 cup
16 tablespoons dry	1 cup
3 teaspoons	1 tablespoon
2 tablespoons butter	1 ounce
1 pound loaf bread crumbled	5 cups
4½ cups ground coffee	1 pound
1 square chocolate	1 ounce

Use Your "Tact"

How many foods do you like just because you know they are good for you? Probably none, if you are a usual person. And yet, how many times do you tell your family that they should eat carrots or spinach because they are good for them? You should know from your own experience that such a remark arouses a particular dislike for that certain food. Use some other tactics in interesting your family in the foods they should eat, but never tell them that things are "good for them." Rather, try preparing and serving the food appetizingly and telling them it is "unusually good," being sure to have it so.

Fruit Is a Necessity

The acids, sugars, vitamins and mineral salts of ripe fruits are practically ready for digestion. Therefore, fresh, ripe fruits may be eaten at any time when the stomach has not already been overloaded with other foods. Get into the habit of thinking of fruit as a necessary, though none the less enjoyable, part of the daily diet.

To Remove Leather Stains

WHITE stockings often become stained from the inside of leather shoes. You can remove the stain in this way: Make a solution of half an ounce of oxalic acid and one pint of water. Dip the stained parts into it. Rinse thoroughly, otherwise the acid may leave a stain or burn the stocking.

Limit the water that you drink at meal time to one glass. But from eight to 10 glasses is considered the proper daily water ration, so you will not have to drink sparingly between meals.

Picnic "Goodies"

WE HAVE discussed the planning of picnic meals, and now we will consider as many recipes as space will permit for sandwiches, salads, cookies, etc., appropriate for out-of-doors suppers. Here are a few rules for sandwich making which will, if followed, insure tasty and attractive looking sandwiches: Cut the bread thinly and evenly; cream the butter before spreading and spread evenly; make lettuce and other leaf sandwiches just before serving; season fillings well and spread over entire surface of bread; brown or whole wheat bread increases the richness and flavor; leave the brown crusts on the bread.

Peanut Butter Sandwiches

1 lb. roasted peanuts, unshelled	3 t. salt
2 c. boiled salad dressing	3 loaves bread
	¾ lb. butter

Shell and finely grind peanuts. Mix with salt and salad dressing. Slice bread thinly and spread each alternate slice with peanut mixture, the remaining slices with butter. Put slices together and cut lengthwise or diagonally into two sandwiches.

Neuchatel Sandwiches

Mix together cheese softened with cream, a bit of onion juice, a few chopped nuts. One pimento for each pot of cheese. Work all together and spread between thin slices of buttered bread.

Sweet Sandwiches

Figs	Raisins
Dates	Nuts

Grind above together in any desired proportion. Moisten with sweet cream and spread between thin, buttered slices of bread.

Cress and Egg Sandwiches

Mix together hard cooked, chopped eggs with chopped watercress and mayonnaise or boiled dressing. Chopped pickle may be substituted for cress. Spread between rounds of fresh white bread.

Deviled Ham Sandwiches

Mix deviled ham or ground baked ham, chopped hard cooked eggs, and chopped pickle with sufficient boiled dressing or mayonnaise to make a paste. Spread between slices of buttered bread. A lettuce leaf may be placed between also.

Pimento Cheese Sandwiches

Put stuffed olives through the food chopper and cream with pimento cheese. Add finely chopped nuts and sufficient dressing to spread easily. Spread between slices of buttered white or brown bread.

Sardine Sandwiches

1 can boneless sardines, mashed	Juice of one-half lemon

Use enough mayonnaise dressing to make a smooth paste. Spread between slices of bread. Add slices of cucumbers or a lettuce leaf.

Ham Sandwiches

Slice ham thinly, lay on slice of buttered bread, spread with mustard and lay on lettuce leaf and top slice of bread. Ham with sliced tomatoes makes an excellent sandwich. These must be eaten as soon as prepared.

Cottage Cheese Sandwiches

These are of infinite variety. Nuts, lettuce, tomato, bacon, ham or marmalades all combine well with cottage cheese. Rye bread spread with butter and cottage cheese is especially good.

Egg Sandwiches

Scrambled or fried eggs are delicious sandwich fillings. Bits of fried ham or bacon may be added to the scrambled eggs. Scrambled egg sandwiches should be spread while warm.

Potato Salad

1 qt. cold boiled potatoes	½ t. salt
1 onion finely cut	Chopped sweet pickles
Chopped parsley	

Cut potatoes into slices or cubes, add onion and mix with salt, parsley and pickles. Moisten with ½ c. of boiled dressing, mayonnaise or French dressing. Serve on lettuce leaves with garnish of sliced hard cooked eggs. Chopped hard cooked eggs may be used in the salad also.

Boiled Dressing

1 T. flour	1 t. mustard
1½ T. sugar	⅓ c. milk
¼ c. vinegar	Yolks 2 eggs
1½ T. melted butter	Cayenne pepper
½ T. salt	

Mix dry ingredients, add eggs, then milk. Lastly add vinegar gradually. Cook in double boiler until thick. Add butter and cool.

Mayonnaise Dressing

1 egg yolk	1 c. salad oil
½ t. dry mustard	2 T. vinegar or lemon juice
½ t. salt	
Cayenne pepper	

Have utensils and ingredients cold. Put egg yolk in bowl, add seasonings, add oil slowly, drop by drop, beating until thick. Thin with vinegar or lemon juice; continue adding oil and vinegar until all is used. Keep in cool place.

Chicken Sandwiches

Cold boiled or roast chicken cut in small pieces. Arrange lettuce leaf on slice of buttered bread, spread layer of chicken mixed with mayonnaise or boiled dressing and cover with second layer of bread. Or leave out dressing and use slices of ripe tomato to give flavor.

Combination Salad

1 large cucumber, peeled and sliced	2 c. lettuce, shredded
1 c. cabbage, shredded	½ c. red radishes cut fine

Mix all together and add any good salad dressing. Garnish with hard cooked eggs, sliced.

Shrimp Salad

Shredded cabbage and can of shrimp mixed with mayonnaise or boiled dressing. Tuna fish may be substituted for shrimp. Chopped walnuts or peanuts are a delightful addition.

Oatmeal Cookies

1¼ c. sugar	1 t. ginger
1 c. shortening	2 c. flour
3 c. rolled oats	1 c. dates, chopped
2 eggs	1 t. soda
½ c. sour milk	1 t. salt
1 t. cinnamon	

Cream shortening and sugar, add beaten eggs, rolled oats, dates, salt, spices, soda dissolved in milk, and flour. Mix and drop from tip of spoon on oiled baking sheet. Bake in moderate oven 10 to 12 minutes.

Measurements

1 c. equals 1 cup.
1 t. equals 1 teaspoon.
1 T. equals 1 tablespoon.
1 lb. equals 1 pound.
1 qt. equals 1 quart.

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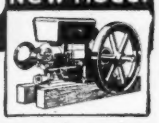

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THE HIGHLANDS OF SOUTH MISSISSIPPI offer a wonderful opportunity in Horticulture. Superior soil for Satsuma Oranges, Peaches, Pecans, small fruits and truck-farming. Healthful climate cooled in Summer and warmed in winter by Gulf influences. Land fertile, free of alkali, hard pan or rock. Soft, pure artesian water. Good roads. Splendid high schools. We offer good improved farms at low prices on easy terms. Write for particulars. South Mississippi Realty Co., Picayune, Miss.

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EXCELLENT UNIMPROVED FARM LAND AT $10.00 per acre. Best neighbors and schools, Northeastern Michigan. Title papers accompanied by certificate from Bureau of Agricultural Industry of State of Michigan certifying quality of soil and other conditions under Michigan new Land Certification Act. Write for particulars, to Harry C. Kinne, 1629 Burnham Bldg., 160 No. LaSalle St., Chicago, Ill.

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FARMS WANTED—BY 800 BUYERS. SEND particulars. Co-operative Land Co., St. Louis, Mo.

WANTED—TO HEAR FROM OWNER OF FARM for sale. O. R. Hawley, Baldwin, Wisconsin.

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EARN MONEY AT HOME DURING SPARE time painting lamp shades, pillow tops for us. No canvassing. Easy and interesting work. Experience unnecessary. Nileart Company, 2266, Fort Wayne, Indiana.

EARN MONEY WEEKLY SPARE TIME, ADdressing, mailing circulars. We pay weekly. Send for full particulars. Rica Co., 1658 Broadway, Dept. K-25, New York.

WANTED—LADIES TO EMBROIDER LINENS for us at home during their leisure moments. Write at once. "Fashion Embroideries," 1528 Lima, Ohio.

PATENTS AND TRADE-MARKS

"PATENT PARTICULARS" AND ADVICE ON trade-marks, free. Write. Sterling Buck, W-629F, Washington, D. C.

AGENTS WANTED

BIG MONEY AND FAST SALES. EVERY owner buys Gold Initials for his auto. You charge $1.50; make $1.35. Ten orders daily easy. Write for particulars and free samples. American Monogram Co., Dept. 92, East Orange, New Jersey.

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COMPETENT MAN WITH REFERENCES TO superintend picking and packing 15,000 bushels peach crop near Pittsburg. Harvest Aug. 10 to Oct. 20. No shipping. A. M. Bell, 929 Ridge Ave., Pittsburgh, Pa.

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CHICKS, 7C UP, C. O. D. ROCKS, REDS, LEGhorns and Mixed. 100% delivery guaranteed. 19th Season. Pamphlet. C. M. Lauver, Box 85, McAlisterville, Pa.

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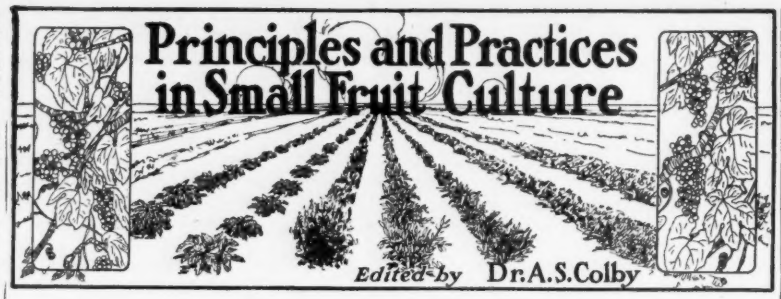

Disease Factors in Raspberry Growing

OF THE small fruits, the raspberry is probably second in importance to the strawberry. Its ripening season comes just after that of strawberries and thus supplies the finest of fresh fruit before the tree fruits come on the market. By a wise choice of vari ties of red, black and purple types, fresh berries may be picked over a period of at least seven weeks in June and July. Everbearing raspberries, if given special attention, will produce a crop in the fall. A supply of this delicious fruit, canned or otherwise preserved, furnishes, with its original raspberry flavor, a pleasing and healthful part of the meal during the winter months.

There are three distinct types of raspberries being grown in Illinois, the red, black and purple. Of these, the greatest acreage is devoted to black varieties, followed by red and purple raspberries in turn. The reds are not as popular as the blacks as they cannot be grown as economically, producing, as they do, less to the acre and ripening unevenly over a considerable period. For some time the blacks have been the predominating type in the state, being more adaptable to our soil and climatic conditions than the reds. There are, however, indications that certain purple varieties of merit will gradually supersede the blacks, since they are more productive,bear fruit of higher quality and are seemingly the least subject to disease of any of the three types.

Raspberry culture in Illinois has been declining in importance as a fruit growing industry for a number of years. In the 1919 census, Illinois is reported as producing 1,834,337 quarts of raspberries, a decrease of 110,999 quarts from the 1909 crop. There are various contributing causes for this decrease, such as unfavorable economic conditions, the practice of incorrect methods of culture and the spread of destructive diseases. Insect pests as yet have had no considerable effect in limiting raspberry culture.

Economic problems of production and distribution are largely local, and vary from year to year. Help in growing and picking is usually recruited nearby and the local markets in most cases handle the fruit easily, except in case of strawberries and grapes.

Pruning

The second limiting factor, incorrect cultural practices, has to do largely with methods of pruning and soil treatment. It is often the case in pruning that insufficient wood is removed which results in too great a strain on the plant to properly mature the fruit. Some blackcap varieties bear their fruit quite well out on the laterals, while the reverse is true of others. It is thus easy to imagine how the same amount of wood cut away from one variety would remove many fruit buds, while the reverse would be true of another variety. Pruning also has an important bearing on control of anthracnose. Cutting out and removing infected canes should be carefully done as soon after the fruiting season as possible.

Plant Food

An essential in successful raspberry growing is a supply of available plant food in solution close to the feeding roots, especially during the ripening season. Drought is one of the greatest enemies of the raspberry. Clean, shallow cultivation, or mulching is necessary. A profitable crop is impossible in a weed patch or along a fence row. It has been found at the Illinois Experiment Station that mulching with strawy manure increased the crop of red raspberries 52 per cent. The berries were also larger and of better appearance than those grown under clean cultivation. The decreased labor expense in cultivation, especially in hand hoeing, was also a considerable item. Moreover, unnecessary suckers were less in evidence in the mulched rows.

Destructive diseases, however, constitute the real limiting factors in raspberry culture in Illinois, the most serious at present being crown gall, anthracnose and bramble streak.

Crown Gall

Crown gall is rapidly becoming the limiting factor in growing red and black raspberries, especially in southern Illinois. During the early life of an affected plantation, especially if there is no anthracnose present, the plants may, in favorable seasons, grow indifferently and produce fair crops. With the added handicap of unfavorable weather, however, such as often prevails in summer and fall, the plants go into winter in a weakened condition, resulting in much so-called winter injury. In a number of plantations observed this year, many fruiting buds appeared to be alive when the pruning was done but did not have enough vigor to leaf out in the spring. Many young shoots wilted and broke down in infected plantations, while much of the fruiting wood failed to mature a crop.

Crown gall does not necessarily appear the first season as a gall outside the plant, so nursery inspection is fundamentally unsafe. Short time inspection is unsatisfactory. The general practice of shipping stock on which no visible galls appear does not get to the root of the matter and has led to a more widespread distribution of the disease to fruit plantations than is generally known. Rotation of crops and growing fresh nursery stock on clean soil one season before being planted out in its permanent location are suggested as possible means of control to the raspberry grower, until he is able to buy disease-free stock generally.

Anthracnose

Anthracnose can be controlled by spraying; crown gall cannot. Infected nursery stock is spreading the disease far and wide. Considerable material ordered especially for planting at the Experiment Station this season had to be destroyed because of numerous galls on the roots. If crown gall is to be controlled, more care must be taken by those interested, both in refusing to accept and plant infected stock on the one hand, and in attempting to grow disease-free plants in clean soil on the other. A system of selection of clean plants through a period of years, of growing on uninfected ground and carefully inspecting every plant before shipment, will result in a supply of stock practically disease-free. These plants will be well worth a slight premium both to the amateur and commercial grower in the establishment of new patches and in giving a fresh start to the industry. In an effort to secure stock free from crown gall at the Experiment Station at Urbana, tips have been rooted from all blackcap varieties being grown there in large pots of disease-free soil. These pots are partly sunken in the ground near the parent plants. The new plants resulting will be carefully watched for evidence of crown gall while being grown at least two seasons in disease-free soil.

Anthracnose is widespread over Illinois and where the plantation is already infected with crown gall, it is often the "last straw" in killing out the plants. Where it is the only important disease present, however, it can be commercially controlled by the application of two sprays of lime sulphur, applied in spring. Dormant strength lime sulphur should be used for the application, made just as the first leaves are unfolding. Summer strength lime sulphur should be used a week before the blossoms open. Some sticker may be used to advantage to aid in more efficient coverage of the raspberry canes. Kayso, a commercial casein preparation, was used with good results for this purpose at the Urbana station last season.

Bramble Streak

The third serious disease, "bramble streak," first reported by the writer in Illinois in 1922, is being found quite generally over central and northern Illinois. The characteristic dwarfing of the plant, with its curling effect on the tip leaves of the shoots, and the quite general occurrence of "streaks," or wide pencil stripes, on the young canes, make this disease quite easy of identification after it is once seen. It has been shown by R. B. Wilcox, of the United States Department of Agriculture, that plant lice are instrumental in the spread of this disease. It cannot be controlled by spraying, as far as we know. If the plantation is only slightly infected, prompt removal of diseased plants, as well as several close to them in the same row, and their disposal by burning, will aid greatly in controlling "bramble streak."

The situation is critical in some raspberry growing sections of central Illinois. Many plantations are so seriously infected that the only remedy is to plow up and destroy them at once. Rotation of crops should be practiced for a year or two. By that time it is hoped that a supply of disease-free stock will be available for new plantings. A movement is on foot to secure such stock through roguing out of suspicious plants in nurseries which are comparatively clean. Much of the general distribution of the disease is due to the common practice of securing plants for planting from neighbors in a raspberry growing section. This practice must stop, if we are to be certain that we are not transmitting serious diseases from one farm to another.

SHIPMENTS of strawberries to Panama were made in less-than-car lots this season by the Louisiana Co-operative Strawberry Growers' Ass'n. Movement was by rail to New Orleans and thence by boat. Most shipments were in lots of 200 crates and total movement from Louisiana to Panama was about two carloads up to May 15. The fruit arrived in very good condition and returns from this venture are said to have been quite satisfactory.—*Crops and Markets.*

The National Industrial Conference Board has reported that the farmer pays more taxes in comparison with his income than any other group in the country.

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